

**Allied Paper, Inc./Portage Creek/
Kalamazoo River Superfund Site**

**King Highway Landfill
Operable Unit 3 and Five Former
Georgia-Pacific Mill Lagoons**

**Final Report for Completion of
Construction**

Georgia-Pacific LLC

May 2013



ARCADIS

Infrastructure · Water · Environment · Buildings

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Subject:

Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
King Highway Landfill Operable Unit 3 FINAL Deliverables 12 and 14
Administrative Order by Consent – AOC-ERD-99-010

Dear Mr. Krawczyk:

ARCADIS, on behalf of Georgia-Pacific LLC (Georgia-Pacific), is providing the Michigan Department of Environmental Quality (MDEQ) with the following pursuant to Section 15 of the Administrative Order by Consent (MDEQ Reference No. AOC-ERD-99-010; AOC) for the King Highway Landfill Operable Unit 3 (KHL OU3) and Five Former Georgia-Pacific Mill Lagoons (Mill Lagoons) of the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site located in Kalamazoo, Michigan:

- Two (2) hard copies and one (1) electronic copy of Deliverable 12 of the AOC – the FINAL version of the *Operation and Maintenance Plan* (O&M Plan; ARCADIS, May 2013)
- Two (2) copies and one (1) electronic copy of Deliverable 14 of the AOC – the FINAL version of the *Final Report for Completion of Construction* (Completion Report; ARCADIS, May 2013)

Submittal of this letter and associated deliverables represents completion of Item 5 of the *Schedule for Completing Response Activities* (Modified Schedule) issued by Georgia-Pacific on September 9, 2011, and countersigned by MDEQ on September 12, 2011.

We look forward to MDEQ's issuance of the Certificate for Completion of Construction for the KHL OU3 pursuant to Section 27 of the AOC (Item 6 of the Modified Schedule). If you have any questions, require additional information, or need additional copies of either document, please do not hesitate to contact me.

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Our ref:

B0064583.0004.00675



Mr. Keith Krawczyk
May 6, 2013

Sincerely,

ARCADIS

A handwritten signature in black ink, appearing to read "Patrick McGuire".

Patrick McGuire
Principal Environmental Engineer

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FINAL

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**King Highway Landfill
Operable Unit 3 and Five
Former Georgia-Pacific Mill
Lagoons**

**Final Report for Completion of
Construction**

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	AA-12 GSI Geomembrane Destructive Test Results
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BB	TRI Geomembrane Conformance Test Results
CC	TRI Geomembrane Destructive Test Results
DD	GSI Certification of Liner Completion
EE	Drainage/Barrier Protection Layer QA/QC Laboratory Results

FF	Additional As-Built Drawings and Property Surveys
GG	Documentation of Efforts to Locate Certified As-Built Drawings, Completed Geomembrane Liner Panel Placement Forms, and Environmental Stress Crack Resistance Test Results

AMSL	above mean sea level
AOC	Administrative Order by Consent
Aqua-Terra	Aqua-Terra, Inc.
ASTM	American Society for Testing and Materials
ATV	all-terrain-vehicle
Atwell-Hicks	Atwell-Hicks, Inc.
BBEPC	Blasland & Bouck Engineers, PC
BBLES	BBL Environmental Services, Inc.
BBL	Blasland, Bouck & Lee, Inc.
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
Closure Plan	Cell 1, 2, and 3 Closure Plan for King Highway Landfill
CME	Central Mine Equipment Company
Completion Report	Final Report for Completion of Construction
CQAP	Construction Quality Assurance Plan
CSWO	Certified Storm Water Operator
CT&E	CT&E Environmental Services, Inc.
CTI	CTI and Associates, Inc.
cy	cubic yards
DLZ Laboratories	DLZ Laboratories, Inc.
EDAC	Environmental Drilling and Contracting, Inc.
EDR	Engineering Design Report
EnSys Kit	EnSys Corporation field test kit
ESCP	Erosion and Sedimentation Control Plan

Final License Agreement	Final Environmental License Agreement Associated with the MDOT R-O-W
Final Notice	Final Notice of Environmental Conditions Affecting Property Controlled by the MDOT
former King Mill	former Allied Paper, Inc. King Mill
FML	Flexible Membrane Liner
FSP	Field Sampling Plan
Geocon	Geocon, Inc.
Georgia-Pacific	Georgia-Pacific LLC
GSI	Geo-Synthetics, Inc.
GSE	GSE Lining Technology, Inc.
HEC-2	Hydraulic Engineering Circular No. 2
HMP	Hydrogeologic Monitoring Plan
Inchcape	Inchcape Testing Services
IQAT	Independent Quality Assurance Team
KAR Laboratories	KAR Laboratories, Inc.
KHL	King Highway Landfill
KHL OU	King Highway Landfill Operable Unit
KMR	Kalamazoo Metal Recyclers, Inc.
KRSG	Kalamazoo River Study Group
KSSS	King Street storm sewer
LEL	Lower Explosive Limit
LGMP	Landfill Gas Monitoring Plan
LLDPE	linear low-density polyethylene
LTI	Limno-Tech, Inc.

Mateco Drilling	Mateco Drilling Company
MCL	Michigan Compiled Laws
MDAG	Michigan Department of Attorney General
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
MDOT	Michigan Department of Transportation
mg/L	milligrams per liter
mg/kg	milligrams per kilogram
Millennium	Millennium Holdings, LLC
Mill Lagoons	Mill Lagoons 1, 2, 3, 4, and 5
msl	mean sea level
NAAQS	National Ambient Air Quality Standard
NERC	National Environmental Reclamation Concepts, Inc.
NPL	National Priorities List
NREPA	Natural Resources and Environmental Protection Act
NTU	nephelometric turbidity units
O&M	Operation and Maintenance
OU	operable units
PCBs	polychlorinated biphenyls
PQL	practical quantitation limit
PSI	PSI, Inc.
PVC	polyvinyl chloride
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control

RA	remedial action
residuals	paper-making residuals
RI	Remedial Investigation
RMT	RMT, Inc.
ROD	Record of Decision
R-O-W	right-of-way
Savannah Laboratories	Savannah Laboratories and Environmental Services, Inc.
Site	Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
SOW	Statement of Work
SRD	Substantive Requirements Document
STL	Severn Trent Laboratories, Inc.
TCL/TAL	Target Compound List and Target Analyte List
TECC	Taplin Environmental Contracting Corporation
Terra Contracting	Terra Contracting, LLC
TRI	TRI/Environmental, Inc.
TSS	total suspended solids
UCL	upper confidence level
USEPA	United States Environmental Protection Agency
VOCs	volatile organic compounds
µg/L	micrograms per liter
µg/m ³	micrograms per cubic meter

1. Introduction

This *Final Report for Completion of Construction* (Completion Report) describes the remedial action (RA) implemented at the King Highway Landfill Operable Unit (KHL OU) and the Five Former Georgia-Pacific Mill Lagoons at the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site (Site or Superfund Site). The Superfund Site, which is located in Kalamazoo and Allegan Counties, Michigan, was included on the National Priorities List (NPL) in 1990 in response to the presence of polychlorinated biphenyls (PCBs) in fish, sediment, and surface water. The Site encompasses 80 miles of the Kalamazoo River between Morrow Dam and Lake Michigan, and a stretch of Portage Creek from Cork Street to its confluence with the Kalamazoo River. The Superfund Site also includes a series of landfill operable units (OUs), located adjacent to the river and creek that were once used as disposal areas for waste materials from local paper mills. Work at each of the OUs has proceeded separately. The KHL OU, located in the City of Kalamazoo and Kalamazoo Township, Kalamazoo County, Michigan (Figure 1), is one of the OUs associated with the Superfund Site.

The KHL OU encompasses several areas as defined in the *Administrative Order by Consent* (AOC) (Michigan Department of Environmental Quality [MDEQ] Reference No. AOC-ERD-99-010; Appendix A) signed February 8, 2000, including the King Highway Landfill (KHL), the King Street Storm Sewer (KSSS), and an approximately 2,100-foot stretch of the Kalamazoo River contiguous to the KHL (Figure 2; MDEQ 2000). This Completion Report also addresses the RA performed at the Georgia-Pacific LLC (Georgia-Pacific) former Mill Lagoons 1, 2, 3, 4, and 5 (Mill Lagoons) (Figure 2A), located on the Georgia-Pacific property north of the KHL OU across the Kalamazoo River, and the area immediately south of the Georgia-Pacific property owned by the Michigan Department of Transportation (MDOT) (Figure 2). Additionally, included in this Completion Report in Section 1.1 is a brief discussion of the former Allied Paper, Inc. King Mill (former King Mill) located approximately 1,500 feet west from the KHL OU.

The RA at the KHL OU was conducted between 1996 and the present. Blasland, Bouck & Lee, Inc. (BBL; currently ARCADIS)¹ provided overall project coordination during this period and has prepared this report on behalf of Georgia-Pacific to satisfy the documentation requirements stipulated in the AOC. The AOC was entered into voluntarily by and between MDEQ and Georgia-Pacific pursuant to the authority vested in MDEQ by Sections 20119 and 20134(1) of Part 201 of the Natural Resources and Environmental Protection Act (NREPA) (Michigan Compiled Laws (MCL) 324.20119 and 324.20134[1]).

¹ BBL was acquired by ARCADIS in 2006. Accordingly, references to BBL and ARCADIS may be used interchangeably throughout this report, as the activities summarized herein span the periods of involvement by both companies.

1.1 Site Location and History

The KHL occupies approximately 23 acres, the Mill Lagoons occupy approximately 7 acres, and the KSSS occupies approximately 1 acre, all within the City of Kalamazoo and Kalamazoo Township, Kalamazoo County, Michigan. The KHL OU and Mill Lagoons are located in the northern half of the northeast quarter of Section 23, Township 2S, Range 12W (see Figure 1 for location map).

The KHL was originally a series of lagoons constructed and used by the Kalamazoo Paper Company for dewatering the underflow from the paper mill's primary clarifier located on the northern side of the river. From the mid-1950s until the late 1950s, underflow from the primary clarifier went to the original five former lagoons (Mill Lagoons) located adjacent to the primary clarifier on the mill property. In the late 1950s, the underflow was sent to the King Highway lagoons (which later became the KHL) on the southern side of the Kalamazoo River for dewatering. From that time forward, the original Mill Lagoons were then only used as an emergency backup system. Georgia-Pacific dewatered paper-making residuals (residuals) in the King Highway lagoons until 1977. The installation of belt filter presses at the mill in 1977 eliminated the need to use the King Highway lagoons for dewatering. The King Highway lagoons were not used again until 1983, when the property was licensed as a landfill for disposal of residuals.

The most prominent features of the KHL OU that were mentioned above are discussed below and shown on Figure 2.

KHL

Cells 1, 2, 3, and 4 of the KHL were first licensed by the Michigan Department of Natural Resources (MDNR) in 1983 under a construction permit. MDNR subsequently issued an operating permit for Cells 1, 2, and 3 under Public Act 641 as a Type III landfill in 1983. Between 1987 and 1998, the Cells 1, 2, and 3 of the KHL were used by Georgia-Pacific for the disposal of dewatered residuals (Blasland and Bouck Engineers, P.C. [BBEPC] 1992). Cell 4 was not included in the landfill permit, and dewatered residuals were not disposed of in this area. Cell 4 was only used as a dewatering lagoon prior to 1977.

The KHL (Cells 1, 2, 3, and 4) occupies approximately 15 acres and the associated access roads, buffer areas, berms, and dikes occupy approximately 8 acres. The KHL included a perimeter dike and several dividing berms. The dike (located between the KHL and the Kalamazoo River) extended along the northern and eastern perimeters of the KHL (Figure 3).

Areas Directly Adjacent to the KHL

The “Areas Directly Adjacent to the KHL” was defined in the AOC as the area located on the eastern and northern sides of the KHL, as this area included an approximately 2,100-foot long stretch of the Kalamazoo River contiguous to the KHL (Figure 2). During the RA, the lateral extent of investigation and cleanup activities out into the Kalamazoo River in this area was a maximum of 50 feet, as prescribed in the AOC.

The Areas Directly Adjacent to the KHL also includes the MDOT Right-of-Way (R-O-W) located south of the site security fence. The lateral extent of investigation and cleanup activities in this area is discussed in Section 11.

KSSS

The KSSS is located adjacent to Cell 1 of the KHL (Figure 2). The KSSS area consists of the eastern and western banks of an approximately 135-foot long inlet of the Kalamazoo River. The KSSS also includes an approximate one-acre area of floodplain located at the discharge point (i.e., where it empties into the Kalamazoo River). A 10-foot-by-5-foot concrete box culvert is at the head of the KSSS.

Mill Lagoons

The Mill Lagoons and a portion of the adjacent floodplain are located on the former Georgia-Pacific Kalamazoo Mill property (Figure 2). Figure 2A presents the Mill Lagoon property boundaries described in Attachment 2 of the AOC. The Mill Lagoons were developed and used by the Kalamazoo Paper Company from the late 1950s until 1967, and by Georgia-Pacific from 1967 to 1977 for dewatering of the underflow from the primary clarifier at the mill located east of the lagoons. The lagoons were individually oriented in an east-west direction; Lagoons 1, 2, and 3 were located northwest of the mill (Figure 2), and Lagoons 4 and 5 were located adjacent to the primary clarifier (Figure 2). Figure 2A shows the Mill Lagoon site plan.

Former King Mill

Although not considered part of the KHL OU and the Mill Lagoons, a discussion of the former King Mill is included in this Completion Report because residuals from this area were disposed at the KHL. In addition, during operation of the King Mill, paper-making process wastewater following primary treatment was conveyed to the Kalamazoo River via a 48-inch concrete culvert which discharged to the Kalamazoo River adjacent to the KSSS outfall, according to city sewer maps (BBEPC 1992).

The former King Mill is located southeast of the intersection of East Vine Street and Clarence Street in the City of Kalamazoo, Michigan approximately 1,500 feet from the KHL OU. Residuals from King Mill operations were evidently excavated by Millennium Holdings, LLC (Millennium) and disposed of in two onsite lagoons (referred to as Lagoon EW and Lagoon NS) located east of the former King Mill. Between August and October 1999, approximately 75-80% of Lagoon EW was excavated while Lagoon NS still remains. The excavated residuals were consolidated into the KHL.

1.2 Summary of Remedial Action Activities

The purpose of the RA, as defined in the *Statement of Work* (SOW) included as an attachment to the AOC (Appendix A), was the elimination or reduction of the potential migration of PCBs to the Kalamazoo River from the KHL OU and the Mill Lagoons.

The RA activities completed at the KHL OU and the Mill Lagoons began in 1996 and have continued to the present when appropriate restrictions are expected to be placed on Georgia-Pacific's property containing the five former lagoons. The work included the following major components:

- Installation of sheetpiling to stabilize KHL dikes conducted in 1994 and between October 7, 1996 and December 23, 1996.
- Cell 4 dike stabilization completed in 1998.
- Modifications to the groundwater monitoring system conducted in 1998 and 2002
- Removal of visible PCB-containing soils, sediment, and residuals from the KSSS (conducted in June 1999), a portion of the Kalamazoo River directly adjacent to the KHL (conducted from August to October 1999), the Mill Lagoons (conducted from November 1998 to September 1999), and a portion of the adjacent floodplain area (interim response action; conducted from July to September 1999), and placement of those materials into the KHL.
- Placement of residuals and soils excavated by Millennium from a portion of one of the former King Mill Lagoons into the KHL prior to construction of the cover system between August and October 1999.
- Construction of a final cover system at the KHL consisting of:
 - Soil gas-venting layer (installed between October 19 and November 2, 1999)

- Linear low-density polyethylene (LLDPE) liner (installed between October 20 and December 15, 1999)
- Soil drainage/barrier layer (installed between November 16 and December 17, 1999)
- Vegetation layer (installed between May 21 and June 7, 2000)
- Implementation of access restrictions and site security (e.g., warning signs, fencing) installed between September 1999 and August 2000.
- Installation of landfill gas monitoring and control features (e.g., perimeter venting trenches constructed between November 2003 and April 2008, perimeter gas monitoring probes installed between April 2002 and October 2011, wind turbine ventilators installed in June 2003).
- Acquisition of the Triangle Parcel at the southwest corner of the KHL in early 2006; and Parcels A and B along the southern boundary of the KHL in June 2008 to ensure that all structures and/or components of the remedy were located on property owned by Georgia-Pacific. Additional information regarding this property acquisition is provided in Section 11.1.
- Excavation and offsite disposal of some of the PCB-containing soils/residuals from the western portion of the MDOT R-O-W located south of the site security fence between August 30 and November 19, 2010. As part of this remedial activity, a certain area of PCB-containing soils/residuals was left in place. This area, referred to as Parcel C, was delineated through visual observation and analytical testing via the advancement of soil borings and the excavation of test pits. The top one foot of material in Parcel C was excavated and an orange non-woven geotextile (demarcation layer) was placed at the bottom of the excavation. The area was then backfilled with a one-foot-thick layer of clean backfill material, graded, seeded, and mulched to promote drainage and facilitate revegetation. A *Final Environmental License Agreement Associated with the MDOT R-O-W* (Final License Agreement; ARCADIS March 2010; Appendix A) was executed between MDOT and Georgia-Pacific – this was the mechanism by which MDOT allowed the PCB-containing soils/residuals to remain within its property. In parallel with the Final License Agreement, the *Final Notice of Environmental Conditions Affecting Property Controlled by the MDOT* (Final Notice; Appendix A) was developed in coordination with MDEQ and recorded with the Kalamazoo County Register of Deeds on January 28, 2011 to notify any potential future owners of the property that PCB-containing material remained below grade within this area. Appropriate restrictions are being placed on the Georgia-Pacific property containing the lagoons, and are being developed concurrent with this review of this Completion Report. Additional information regarding these activities is included in Section 11 of this Completion Report.

- Installation of permanent markers in the MDOT R-O-W between May 11 and May 18, 2011 to notify the public of the environmental conditions that exist. Specifically, PCB-containing residuals present below the demarcation layer installed one foot below grade within Parcel C.

1.3 Summary of Design Modifications

The RA was implemented and constructed as detailed in the approved final design. The remedial design was submitted in several individual documents, which include, but are not necessarily limited to, the following:

- *King Highway Landfill Operable Unit Cell 4 Closure Engineering Design Report* (EDR; BBL June 2002; Appendix A)
- *Cell 1, 2, and 3 Closure Plan for KHL* (Closure Plan; RMT, Inc. [RMT] 1996)

Since the original submissions of the EDR (BBL June 2002; Appendix A) and Closure Plan (RMT 1996), numerous minor modifications to these reports have been made that were mutually agreed upon by MDEQ, the United States Environmental Protection Agency (USEPA), and Georgia-Pacific. Ultimate approval of the remedial design was provided by MDEQ by way of the *September 27, 2002 Final Design Approval Letter* (Appendix A).

The following provides a general summary of modifications to the remedial design since final design approval was provided in September 2002. The substantial majority of these modifications are associated with the installation of various landfill gas control and monitoring devices, which were implemented in reaction to landfill gas monitoring data that indicated methane was migrating off-site following capping of the landfill. While explicit written approval was not necessarily provided for each of the modifications listed below, MDEQ was notified of these modifications in advance via e-mail correspondence and/or individual work plans, and typically concurred via verbal communication or e-mail (as documented in Appendix A).

- Installing wind turbine ventilators on each of the 23 passive gas riser vents to further facilitate the venting of landfill gas (completed in June 2003)
- Removing accumulated sediment and soil in the bottom of the sedimentation basin (completed in November 2003), based on a survey indicating that filling occurred in the bottom of the basin, resulting in bottom elevations higher than design elevations
- Removing the paved access road and subgrade on the southern border of the KHL to release potentially trapped gases (completed in June and December 2003)

- Installing Trench A – a 100-foot-long, 6-foot-deep landfill gas cutoff trench to the west of the KHL and east of the Kalamazoo Metal Recyclers, Inc. (KMR) property in November 2003
- Installing three passive gas riser vents (V-4-1, V-4-2, and V-4-3) equipped with wind turbine ventilators within Trench A in November 2003
- Installing a 6-foot-deep polyvinyl chloride (PVC) liner trench approximately 4.5 feet west of Trench A in June 2004
- Installing five additional permanent gas monitoring probes (GW-5 through GW-9) in May 2005 to a depth of approximately 3.5 feet below ground surface (bgs) in the northern portion of the MDOT R-O-W to facilitate continued monitoring efforts
- Installing two additional permanent gas monitoring probes (GW-10 and GW-11) to a depth of approximately 3.5 feet bgs in June 2005 – one on the southern side of King Highway within the R-O-W (GW-10), and one to the west of Trench A and west of the KHL (GW-11)
- Installing Trench B – a 150-foot-long, 10-foot-deep landfill gas cutoff trench to the west of the KHL and east of the KMR property in April 2006
- Installing three passive gas riser vents (V-4-4, V-4-5, and V-4-6) equipped with wind turbine ventilators within Trench B in April 2006
- Installing one additional permanent gas monitoring probe (GW-12) to a depth of approximately 10 feet² to the west of Trench B and west of the KHL in April 2006
- Installing Trench C – a 150-foot-long, 5-foot-deep landfill gas cutoff trench along the inside of the fence in the southeast corner of the KHL in January 2008
- Installing 16 passive gas riser vents (V-2-3 through V-2-18) equipped with wind turbine ventilators within Trench C in January 2008
- Installing Trench D – a 200-foot-long, 10-foot-deep landfill gas cutoff trench south of gas monitoring probe GW-1 and north of the site security fence between January and April 2008

²Per the March 15, 2006 e-mail (Appendix A; Attachment 2 to the 2006 2nd quarter post-closure landfill gas monitoring report), GW-12 was proposed to be installed to a depth of 10 feet bgs.

- Installing five passive gas riser vents (V-1-2 through V-1-6) equipped with wind turbine ventilators within Trench D in April 2008
- Modifying the pore water discharge pipe (located at the southwest corner of the KHL) to reconnect the original pore water discharge pipe established during the original remedy implementation and disconnect the southern discharge pipe, such that pore water no longer discharges into the MDOT R-O-W (completed in 2008). In 2010, the original pore water pipe established during the remedy implementation was reconnected, and the southern discharge pipe was disconnected. In 2012, the south pore water pipe was located and extended into the riprap spillway of the settling pond located on the western side of the KHL
- Installing five additional permanent gas monitoring probes (GW-13 through GW-17) along the west and south sides of the KHL in October 2011. The construction logs for these gas probes are contained within Appendix U
- Purchasing the Triangle Parcel from MDOT in early 2006 and Parcels A and B from MDOT and the City of Kalamazoo, respectively, in June 2008 to provide appropriate access and protection to certain components of the RA that had been were construction on these parcels
- Finalizing the language of the Restrictive Covenant for the KHL OU (including the five former Mill Lagoons), which will prohibit or place significant limitations on activities that may interfere with the RA, and with the operation and maintenance, monitoring, and other measures necessary to assure the effectiveness and integrity of the RA

1.4 Reference Documentation

A variety of response activities, which together make up the RA, were designed and implemented to meet the performance standards and specifications set forth in the KHL OU *Record of Decision* (ROD; Appendix A) and the AOC and associated SOW (Appendix A) issued by the USEPA on February 10, 1998 and by the MDEQ on February 16, 2000, respectively. Key documents developed to support the response activities include:

- *Remedial Investigation/Feasibility Study – Quality Assurance Project Plan (QAPP)* (BBEPC 1993a)
- *Remedial Investigation/Feasibility Study – Field Sampling Plan (FSP)* (BBEPC 1993b)
- *Cell 1, 2, and 3 Closure Plan for KHL (Closure Plan)* (RMT 1996)

- *Erosion Control System Construction Documentation* (RMT March 1997; Appendix A)
- *Substantive Requirements Document (SRD)* (MDEQ 1998)
- *KSSS Remedial Action Work Plan* (BBL June 1999; Appendix A)
- *Remedial Action Work Plan – Georgia-Pacific Mill Lagoons* (BBL June 1999; Appendix A)
- *Sediment Probing Work Plan* (BBL June 1999; Appendix A)
- *Remedial Action Turbidity Monitoring Plan* (BBL July 1999; Appendix A)
- *Residuals Removal Work Plan for Areas Adjacent to KHL* (BBL August 1999; Appendix A)
- *Preliminary Draft King Highway Landfill Operable Unit 3 Final Report for Completion of Construction* (BBL 2001)
- *Technical Review of the King Highway Landfill Operable Unit Final Report for Completion of Construction* (Camp Dresser & McKee September 2001; Appendix A)
- *Landfill Gas Monitoring Plan (LGMP)* (BBL June 2002; Appendix A)
- *Final King Highway Landfill Operable Unit Cell 4 Closure Engineering Design Report (EDR)* (BBL June 2002; Appendix A)
- *Final King Highway Landfill Operable Unit Closure Erosion and Sedimentation Control Plan (ESCP)* (BBL 2002a)
- *Final King Highway Landfill Operable Unit Closure Construction Quality Assurance Plan (CQAP)* (BBL 2002b)
- *Final King Highway Landfill Operable Unit Hydrogeologic Monitoring Plan (HMP)* (BBL 2002c)
- *Pre Final Inspection Report* (BBL February 2003; Appendix A)
- *Draft Final King Highway Landfill Operable Unit 3 Final Report for Completion of Construction* (BBL 2003a)
- *Draft Final King Highway Landfill Operable Unit Post-Closure Operation and Maintenance Plan (O&M Plan)* (BBL 2003b)

- *Further MDEQ Comments on the King Highway Landfill Final Report for Completion of Construction* (MDEQ November 2003; Appendix A)
- *Additional MDEQ Comments on the King Highway Landfill Final Report for Completion of Construction* (MDEQ April 2004; Appendix A)
- *Draft Final King Highway Landfill Operable Unit 3 Final Report for Completion of Construction* (currently being reviewed that addresses features requiring monitoring and maintenance) (BBL May 2004; Appendix A)
- *Source Investigation at the Former Kalamazoo and Hawthorne Mill Properties* (Source Investigation Report) (ARCADIS June 2009; Appendix A)

The Source Investigation Report contains information related to the excavation and verification sampling conducted outside the Mill Lagoon property boundary, northwest of Mill Lagoon 1. Specifically, Section 3.1 and Attachment 7 of the Source Investigation Report provide additional detail regarding the excavation and verification sampling activities conducted northwest of Mill Lagoon 1.

1.5 Project Roles and Responsibilities

Implementation of the various RA activities at the KHL OU and the Mill Lagoons involved several firms over the 15 years of work. Each firm had a specific role and responsibility in completing the response activities, as described below.

- **Kalamazoo River Study Group (KRSG)** – The KRSG formerly consisted of the various potentially responsible parties identified for the Site, namely Millennium, Georgia-Pacific, Fort James Corporation, and Plainwell, Inc.³
- **Georgia-Pacific** – Georgia-Pacific is the current owner and most recent operator of the KHL OU and the Mill Lagoons. Georgia-Pacific secured the services of the various firms involved in the RA and provided overall direction and coordination during implementation.
- **MDEQ** – MDEQ served as the lead regulatory agency for this project. MDEQ provided a project coordinator to administer MDEQ's responsibilities and to receive, review, and approve written notices, reports, plans, and other documentation required by the AOC. MDEQ also provided part-time oversight.

³ With the bankruptcy of Millennium Holdings, LLC in January 2009, Millennium no longer has any ongoing involvement with or financial responsibility for the Site or former mill properties. As a result, the KRSG no longer exists, and Georgia-Pacific is currently the only company actively engaged in investigation and cleanup work in the KHL OU.

- **USEPA** – USEPA served as the secondary regulatory agency for this project.
- **RMT, Ann Arbor, Michigan** – RMT was retained by Georgia-Pacific as the design engineer for closure of Cells 1, 2, and 3, and as the General Contractor/Construction Manager for the RA at the KHL OU and the Mill Lagoons.
- **BBL, Syracuse, New York** – BBL (now ARCADIS) was retained by Georgia-Pacific to serve as the design engineer for closure of Cell 4, and to provide the Independent Quality Assurance Team (IQAT) services for the KHL OU and the Mill Lagoons, and overall project coordination.
- **BBL Environmental Services, Inc. (BBLES), Syracuse, New York** – BBLES (now ARCADIS) was retained by Millennium to implement response activities at the KSSS and the King Mill Lagoons.
- **Taplin Environmental Contracting Corporation (TECC), Kalamazoo, Michigan** – TECC, a local construction contracting company, was retained by RMT to implement the RA in the KHL OU. BBLES also retained TECC for work related to the KSSS.
- **Terra Contracting, LLC (Terra Contracting), Kalamazoo, Michigan** – Terra Contracting, a local construction contracting company, was retained by Georgia-Pacific to perform activities related to the RA in the KHL OU.
- **Millennium⁴** – Millennium is the holding company that formerly held the assets to the former Allied Paper Company, and was a member of the KRSG. Millennium was responsible for the excavation of residuals and soils from the KSSS and the King Mill Lagoons.
- **Aqua-Terra, Inc. (Aqua-Terra), Plymouth, Michigan** – Aqua-Terra was retained by Georgia-Pacific to prepare quarterly groundwater monitoring reports during landfill operations.
- **Atwell-Hicks, Inc. (Atwell-Hicks), Ann Arbor, Michigan** – Atwell-Hicks was retained by RMT to provide surveying services.

⁴As noted previously, with the bankruptcy of Millennium Holdings, LLC in January 2009, Millennium no longer has any ongoing involvement with or financial responsibility for the Site or former mill properties. Millennium's settlement with USEPA in April 2010 resulted in the resolution of their third-party environmental liabilities for the river, and transfer of their liabilities for the Allied OU to a custodial trust (Le Petomane XXIII, Inc.).

- **CT&E Environmental Services, Inc. (CT&E), Ludington, Michigan** – CT&E was retained by Georgia-Pacific for laboratory services.
- **CTI and Associates, Inc. (CTI), Brighton, Michigan** – CTI was retained by Georgia-Pacific for the installation of the landfill gas monitoring probes. CTI also conducted the initial monitoring activities as well as the monitoring performed pursuant to the contingency actions outlined in the LGMP.
- **DLZ Laboratories, Inc. (DLZ Laboratories), Lansing, Michigan** – DLZ was retained by Georgia-Pacific for laboratory services.
- **Environmental Drilling and Contracting, Inc. (EDAC), Holland, Michigan** – EDAC was retained by BBL to install monitoring wells MW-11R and MW-11RR, part of the groundwater monitoring system network.
- **Geocon, Inc. (Geocon), Jenison, Michigan** – Geocon was retained by BBLES to install the temporary sheetpiling around the KSSS.
- **Geo-Synthetics, Inc. (GSI), Waukesha, Wisconsin** – GSI was retained by RMT to install the 40-mil linear LLDPE liner.
- **GSE Lining Technology, Inc. (GSE), Houston, Texas** – GSE was retained by RMT to manufacture and supply the 40-mil LLDPE liner.
- **Inchcape Testing Services (Inchcape), Burlington, Vermont** – Inchcape was retained by BBL for laboratory services.
- **KAR Laboratories, Inc. (KAR Laboratories), Kalamazoo, Michigan** – KAR Laboratories was retained by BBL to serve as the primary analytical laboratory for the analysis of soil, sediment, air, and water samples collected as part of the RA.
- **Kieser & Associates, Kalamazoo, Michigan** – Kieser & Associates was retained by Georgia-Pacific to prepare quarterly groundwater monitoring reports.
- **Limno-Tech, Inc. (LTI), Kalamazoo, Michigan** – LTI was retained by BBL to assist in the collection of monitoring data.
- **Mateco Drilling Company (Mateco Drilling), Grand Rapids, Michigan** – Mateco Drilling was retained by BBL to install the groundwater monitoring system network.

- **National Environmental Reclamation Concepts, Inc. (NERC), Hanover, Michigan** – NERC was retained by TECC for seeding and erosion control services.
- **PSI, Inc. (PSI), Kalamazoo, Michigan** – PSI was retained by BBL to perform required geotechnical testing.
- **Savannah Laboratories and Environmental Services, Inc. (Savannah Laboratories), Savannah, Georgia** – Savannah Laboratories was retained by BBL for PCB analysis of samples collected at the Mill Lagoons floodplain.
- **Sewern Trent Laboratories, Inc. (STL), Burlington, Vermont** (this is a successor to Inchcape) – STL was retained by BBL for laboratory services. TestAmerica Laboratories, Inc. is a successor to STL.
- **TRI/Environmental, Inc. (TRI), Austin, Texas** – TRI was retained by BBL to perform required conformance and Quality Assurance/Quality Control (QA/QC) testing on the LLDPE liner.

1.6 Quality Assurance/Quality Control

QA/QC testing during implementation of the RA was performed by BBL (on a few select days LTI was subcontracted by BBL to assist in collection of monitoring data and observation), and construction observation activities during critical construction activities were performed by both BBL and RMT. The QA/QC tests, where applicable, and results are discussed in this report for each response activity.

1.7 Report Overview

This Completion Report summarizes and documents the activities implemented by Georgia-Pacific to comply with the AOC. Accordingly, this Completion Report includes the following:

- Summary of the work performed, including modifications to the design
- Descriptions of QA/QC testing and testing results
- Environmental monitoring and laboratory analytical results
- Project correspondence (Appendix A)
- Daily construction reports (Appendix B)
- Representative construction photographs (Appendix C)
- Additional construction-related information (Appendices D – EE)
- Additional as-built drawings and property surveys (Appendix FF)

It should be noted that final record drawings related to the top of subgrade topography, top of grading layer topography, final grade topography, and limit of the final cover system were not provided in previous drafts of this Completion Report. Therefore, the construction specifics of items such as the subgrade, final cover system, Flexible Membrane Liner (FML), etc. can only be approximated. Georgia Pacific's efforts to acquire engineer certified as-built drawings of the landfill components have been included as Appendix GG.

2. Site Development

Before commencing the RA at the KHL OU and the Mill Lagoons, several site preparation activities were performed. These included provisions for site security, clearing and grubbing, construction of access roads, installation of permanent and temporary erosion/sedimentation control measures, installation of a decontamination system, and installation of a temporary water treatment system. These activities are described below.

2.1 Site Security

Access to the KHL is restricted by chain-link fencing between the KHL and King Highway (M-96) (Figure 4). Additional fencing, consisting of a 6-foot-tall chain-link fence, was installed along Cell 4 in September 1999 to restrict access to the KHL via the Kalamazoo River. Fencing was installed along the western side of Cell 1, as well as between the KHL and the neighboring scrap yard in August 2000 (Figure 4).

Access to the Mill Lagoons during construction activities was restricted by the security measures established for the mill entrance; these measures included fencing and a check-in gate staffed by security personnel.

Warning signs were posted along the perimeter fencing at maximum intervals of every 200 feet, as well as at all entry gates. The warning signs contained language stating that the site was hazardous due to PCBs in residuals. The warning signs also provide the number of an environmental manager at Georgia-Pacific to contact for more information. All warning signs were utilized as a site security measure in accordance with the SOW, Part II Section K (Appendix A).

2.2 Access Roads

Access roads were built at the KHL and the Mill Lagoons to facilitate operation and maintenance activities. Temporary access roads were built and modified throughout the duration of RA activities and included roads around Cells 1 through 4 and across Cell 3. Two paved entrances and a deceleration lane (Figure 4) were built in September and October 1998 to allow for access and to minimize disturbance to local traffic on M-96 (Appendix D). Temporary access roads associated with each RA activity are described in Sections 4 through 6, as appropriate.

Upon completion of the installation of the final cover system, access for monitoring and maintenance at the KHL was gained by traversing the cover system either by foot or by a lightweight, rubber-tired vehicle. An access road around the west of KHL to the north of Cell 1, and a turnaround at the north end of Cell 3 (Figure 4), were constructed in December 1999.

2.3 Erosion and Sedimentation Controls

Temporary and permanent erosion and sedimentation controls were installed at the KHL OU and the Mill Lagoons prior to RA activities at a particular location. Both the temporary and permanent control measures were used to minimize erosion and sediment loading to the Kalamazoo River, and to minimize sediment transport beyond the limit of disturbance; both types of control measures are summarized below. The specific control measures for each activity associated with the closure of the KHL OU and the Mill Lagoons are discussed with each specific activity in later sections.

As required by the ESCP (BBL 2002a), Soil Erosion Inspection Logs were completed on a weekly basis during construction by an MDEQ-Certified Storm Water Operator (CSWO) at the KHL OU and the Mill Lagoons. Soil Erosion Inspection Logs, completed by RMT for the duration of the RA activities, are included in Appendix E (Appendix E-1 for the KHL OU, and Appendix E-2 for the Mill Lagoons). Soil Erosion Inspection Logs were not completed for the period between December 17, 1998 and January 25, 1999 because construction work was not being conducted during this time. In addition, Soil Erosion Inspection Logs were not completed for the weeks ending November 14, 1998, March 6, 1999, and February 5, 2000. The following provides additional information regarding the absence of these Soil Erosion Inspection Logs:

Week ending November 14, 1998 – The CSWO (F.B. Manning with RMT) preparing the Soil Erosion Inspection Logs was on site on November 12, 1998 for approximately 2½ hours as indicated in the daily field notes for that day (Appendix B). Also, the daily field notes recorded for that week do not indicate that there were any issues associated with soil erosion. In addition, the Soil Erosion Inspection Logs dated November 6 and 20, 1998 indicate that erosion and sedimentation control devices were in good condition and no corrective actions were necessary.

Week ending March 6, 1999 – The daily field notes recorded for that week do not indicate that there were any issues associated with soil erosion. In addition, the Soil Erosion Inspection Logs provided for the weeks before and after (February 22, 1999 and March 8, 1999, respectively) indicate that erosion and sedimentation control devices were intact and no corrective actions were necessary.

Week ending February 5, 2000 – The Soil Erosion Inspection Logs provided for the weeks before and after (January 24, 2000 and February 8, 2000, respectively) indicate that there was no activity due to the site/ground being frozen, and no corrective actions were necessary.

2.3.1 Temporary Erosion and Sedimentation Controls

Sheetpiling – Temporary sheetpiling was installed at the KSSS to act as a temporary barrier between the Kalamazoo River and the disturbed area. It was also used to provide slope stability during RA activities and limit the amount of water entering the site from the Kalamazoo River. Sheetpiling used at the KSSS was removed upon completion of RA activities.

Silt Fencing – Silt fencing was used to reduce storm water runoff velocity and sediment loading to the Kalamazoo River and to the adjacent low-lying areas. The silt fencing consisted of filter fabric secured to posts set in the ground, and was typically installed along the perimeter of the areas where the potential for erosion and sedimentation required fencing. Silt fencing was removed and properly disposed of, and there was no excavation of adjacent earthen material (refer to May 21, 2004 correspondence from Terra Contracting included in Appendix A and daily field notes included in Appendix B).

Silt Curtains – To prevent sediment from entering the Kalamazoo River, silt curtains were erected along the edge of the river, thereby isolating the source of sediment from the current of the river. These temporary physical barriers consisted of PVC geomembrane secured to the undisturbed river bottom. Silt curtains were used at the KSSS, areas adjacent to the KHL, and at the floodplain adjacent to the Mill Lagoons and were removed upon completion of RA activities. As indicated in the daily field notes for July 2, 1998, a turbidity curtain from another site was used. A representative of Terra Contracting (Steve Taplin) stated in a letter dated February 5, 2002 (Appendix A), that this turbidity curtain was decontaminated prior to its deployment.

Watering – Fugitive dust generated during RA activities was controlled by watering access roads and slopes on an as-needed basis throughout the RA activities at a rate that prevented dust but did not cause soil erosion.

2.3.2 Permanent Erosion and Sedimentation Controls

Sheetpiling – Approximately 1,000 feet of steel sheetpiling was installed in two phases to stabilize the existing perimeter berm along the northern side of Cells 1, 2, and 3 of the KHL (Figure 4). In 1994, prior to starting the RA, the first section of sheetpiling (type 2NRD3 supplied by Frodingham) was installed along a 115-foot length of the berm at the toe of the slope to stabilize the slope and to provide erosion control protection. An 866-foot length of sheetpiling (type Z75 supplied by Canadian Metal Rolling Mills) was installed between October and December 1996 (refer to MDEQ approval letter from August 9, 1996 included in Appendix A). The sheetpiling was extended to encompass the northern boundary of the landfill with the Kalamazoo River. The sheetpiling extends from the northwest corner of the landfill, 1,000 feet to the east (Figure 4). The construction activities associated with the installation of the

sheetpiling, as well as typical sheetpile wall construction details are provided in Erosion Control System Construction Documentation (RMT 1997; Appendix A), and on Figure 5.

Vegetative Cover – The vegetative cover layer consisted of soil suitable for the growth of shallow-rooted grasses. Native grasses were planted throughout the KHL and the Mill Lagoons. The mixture consisted of NERC custom seed mix (a typical mix of 50% Tall Fescue, 20% Creeping Red Fescue, 10% Kentucky Bluegrass, 10% Perennial Ryegrass, and 10% Annual Ryegrass, by weight) and was planted at approximately 150 pounds per acre. In addition, crown vetch was planted on the steep berm slopes.

Diversion Berms and Drainage Ditches – Diversion berms and drainage ditches were built on the KHL cover system, diversion berms were constructed to convey storm water off the cover system, and the drainage ditches were constructed to convey storm water off and away from the KHL (Figure 4). A vegetative cover was installed on the berm and ditches. Riprap aprons were used to convey storm water from the cover system diversion berms and drainage ditches to the Kalamazoo River. At the southeast end of Cell 4 and at the eastern end of the sheetpile wall north of Cell 3 (Figure 4), riprap aprons were also constructed for erosion control.

Sedimentation Basin – The sedimentation basin was built to receive storm water runoff from the 25-year, 24-hour storm event; reduce storm water flow velocities from contributing drainage ditches; and allow particulates of 20 microns in diameter and larger to settle out of suspension prior to discharge to the Kalamazoo River. The basin, located at the southwestern portion of the KHL (Figure 4), collects storm water runoff from the cover system surface of Cells 1, 2, and 3 (approximately 63% of total storm water runoff) and reduces sediment loading. The remaining runoff that is not directed to the sedimentation basin (approximately 37%) is discharged to the Kalamazoo River via diversion berms and drainage ditches, as well as sheet flow off Cell 4 (Figure 4). The runoff that collects within the sedimentation basin discharges through a perforated corrugated metal riser pipe outlet structure and culvert located at the southeast corner of the basin.

Survey information collected at the sedimentation basin indicated that filling had occurred in the basin bottom, resulting in bottom elevations higher than design elevations. Georgia-Pacific notified MDEQ, via an October 23, 2003 letter from BBL (Appendix A), of proposed maintenance activities to restore the sedimentation basin back to its original design elevations. Terra Contracting performed the maintenance activities in November and December 2003. The maintenance activities included the removal of approximately 420 cubic yards (cy) of material (i.e., accumulated sediment) from within the basin. The basin's exterior berm was reshaped to reach an elevation more consistent with the design contours. A vegetative cover was installed following earthwork activities. Following the sedimentation basin maintenance activities, an as-built survey (dated February 3, 2004) was performed by Prein & Newhof, a subcontractor to Terra Contracting. The as-built survey and supporting calculations (included as Appendix F)

indicate that the maintenance activities returned the sedimentation basin to its originally intended design contours. At this time, no further maintenance of the sedimentation basin is anticipated. The sedimentation basin will continue to be inspected in accordance with the Final Operation and Maintenance (O&M) Plan.

In 2008, during remedial work within the MDOT R-O-W, the outlet culvert of the sedimentation basin was retrofitted so that it terminates inside the property boundary (i.e., the perimeter site security fence). This measure was implemented so that this component of the remedy was not located outside of Georgia-Pacific's property boundary. Nonetheless, this still allows for surface water runoff to drain into the southern drainage ditch.

Riprap Revetment – Riprap revetment protects the regraded dike soils located adjacent to the Kalamazoo River from river-induced erosive forces. The revetment was placed along the toe of the regraded dike to protect the dike from excessive river flow velocities that could cause bank undermining, erosion, or scour. Hydraulic Engineering Circular No. 2 (HEC-2) was used to assess river velocity and support the sizing of revetment material. The modeling results were presented in the EDR (BBL June 2002; Appendix A) and are included in Appendix G. The riprap was placed to a height on the dike to protect it from a 100-year flood event.

Riprap was also placed along the sheetpiling wall to provide an amphibian habitat for aquatic animals and allow reptiles and amphibians to climb out of the water (refer to MDEQ approval letter dated August 9, 1996 included in Appendix A). MDEQ required that clean rock riprap or broken concrete free of any rebar, asphalt, or any other polluting material be placed immediately riverward of the sheetpile wall. A schematic included with the August 9, 1996 letter indicated that the riprap was to be a minimum of 12 to 18 inches in size. The source and size of the riprap placed along the sheetpile wall is detailed in the *Erosion Control System Construction Documentation* (RMT March 1997; Appendix A), as well as the EDR (BBL June 2002; Appendix A).

As detailed in a June 25, 1999 memorandum submitted to MDEQ (Appendix A), riprap was placed along the KSSS floodplain as a design enhancement related to the restoration of the KSSS excavation areas. A schematic enclosed with the memorandum indicates that the typical size of the riprap was to be 12-inches in diameter.

Erosion Control Blankets – Erosion control blankets were used to control rain-induced ground surface erosion, reduce storm water runoff velocities, and protect exposed soils from runoff. The blankets consist of fibrous materials positioned between bound synthetic netting layers to form composite, blanket-like configurations. These blankets were used as a lining in the drainage channel along King Highway (M-96) and along the steep slopes at the northwest corner of Cell 1 and south of Cells 3 and 4 (Figure 6).

2.4 Decontamination Stations

Working personnel, vehicles, and equipment underwent decontamination before leaving the work area. Decontamination stations were installed at the KHL OU and the Mill Lagoons. Routine decontamination measures included:

- Removal of gross contamination from the outer clothing and boots of personnel leaving the work area.
- Removal of any contaminated outer garments and gloves by personnel, and placement of the garments into waste receptacles.
- Decontamination of vehicles and equipment used during the RA activities before departure from the work site by rinsing the tires and wheel wells with water. If any vehicle or equipment was significantly soiled, steam cleaning or pressure washing was performed.

Wash water was collected, transported to the onsite water treatment system, treated, and discharged to the Kalamazoo River, consistent with the SRD (Part I, Section A, Limitations and Monitoring Requirements) (Appendix H). Daily discharge monitoring reports and the supporting laboratory analytical results are included in Appendix I.

2.5 Water Treatment System

A water treatment system consisting of an electric pump, filtration (for soils removal), and liquid-phase granular two-stage activated carbon (for adsorption of PCBs) was installed to treat water generated by the RA activities and decontamination procedures. Water was pumped via an electric pump and was sent through a Rosedale bag filter equipped with a 100-micron polyester bag, through a second Rosedale bag filter equipped with a 50-micron polyester bag, then to the carbon treatment system. The carbon treatment system consisted of 4,800 pound carbon canisters; the water was split and distributed through the two sets of the canisters set up in parallel.

After treatment and testing, the water was discharged to the Kalamazoo River in conformance with the SRD (MDEQ July 1998; Appendix H). The SRD prescribed sampling procedures, preservation and handling, and analytical protocol for compliance monitoring for PCBs in accordance with *USEPA Method 608* (USEPA 1982). The quantification level was not to exceed 0.1 micrograms per liter (µg/L) total PCBs. The laboratory analytical data are included in Appendix I.

Water treatment efforts were in compliance with the SRD (MDEQ July 1998; Appendix H); issues related to compliance are described below:

On March 17 and 18, 1999, analytical results indicated total suspended solids (TSS) concentrations of 82 milligrams per liter (mg/L) and 69 mg/L, respectively, which were in excess of the daily limit of 45 mg/L contained in the SRD (MDEQ July 1998; Appendix H). As stated in the February 5, 2002 letter from Terra Contracting (Appendix A), water was re-treated on March 25, 1999, prior to discharge.

On April 9, 1999, analytical results indicated an exceedance of the 45 mg/L daily limit for TSS. However, as indicated in the February 5, 2002 letter from Terra Contracting, the sample was not treated effluent, but rather a sample collected of water prior to treatment.

On April 20 and 23, 1999, analytical results indicated TSS concentrations of 47 mg/L and 52 mg/L, respectively. As documented in the May 13, 1999 letter to MDEQ (Appendix A), MDEQ granted approval to discharge to the river and not store treated water pending analysis (due to the large volume of water onsite as a result of heavy rain in the month of April). On May 7, 1999, the TSS concentration exceeded the SRD daily limit of 45 mg/L, as reported on May 7, 1999. The MDEQ was notified of this exceedance on May 13, 1999 (Appendix A). PCBs were detected in treated water on three occasions – June 7, 19, and 25, 1999. In all three cases, the water was retreated and resampled to verify SRD limits were met prior to discharge. These results met the SRD limits (Appendix I).

2.6 Required Permits

Section 121 (e)(1) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) stipulates that a federal, state, or local permit is not required for any remedial action conducted in an area defined as "onsite," provided that the remedial action is carried out in compliance with CERCLA requirements. As provided for by CERCLA, in lieu of submitting a permit application and obtaining a permit, the substantive requirements of applicable permit-authorizing regulations or laws were satisfied by providing necessary information to MDEQ in a form other than a formal permit application, an approach described in the QAPP (BBEPC 1993a). The EDR (BBL June 2002; Appendix A), ESCP (BBL 2002a), and other information previously submitted to MDEQ presented information in support of meeting the substantive requirements of all necessary permits (including, but not limited to, a soil erosion and sedimentation control permit pursuant to Parts 31 and 91 of Michigan Act 451, a National Pollution Discharge Elimination System Permit, and a construction storm water discharge permit under Michigan's Permit-by-Rule for construction activities).

In addition to meeting the substantive requirements of the permits discussed above, Georgia-Pacific also obtained an Earth Change Permit on October 30, 1998 for excavating the landfill

cell and constructing an earthen berm (see Appendix A) as well as a Deceleration Lane Permit (issued August 18, 1998) for constructing a deceleration lane to the KHL for construction traffic at the site (Appendix D).

3. Groundwater Monitoring System Installation, Sampling and Analysis

Groundwater monitoring was conducted during the KHL OU RA activities. The KHL OU groundwater monitoring reports from 1996 to 2003⁵ are included in Appendix J.

At the KHL, additional monitoring wells were installed to establish the groundwater monitoring network. In addition to the wells installed to meet the Landfill Permit requirements and to conduct the Remedial Investigation (RI), five new monitoring wells along the berm were installed in July 1998. These five wells were developed and sampled consistent with the FSP (BBEPC 1993b). The five new monitoring wells, designated as MW-11 through MW-15 consecutively from west to east, were installed in accordance with the *Draft Groundwater Monitoring Plan* (BBL 1998) submitted to MDEQ on July 7, 1998. MW-11 was later replaced with MW-11R. Residuals were observed in the berm where MW-11R was located and soil boring SB-11RR was advanced on February 8, 2000 in an initial attempt to install the replacement monitoring well. During the installation of this soil boring, possible residuals were observed. The area was reexcavated, backfilled, and MW-11RR was installed in clean material. MW-11RR was installed on March 3, 2000.

In September 2000, BBL observed the well casing at MW-2 to be broken near the ground surface, and the casing filled with soil. Due to the damage, and the well's compromised integrity, MW-2 was decommissioned by over-drilling and removing the well casing and backfilling the boring with grout to ground surface. On October 25, 2000, replacement well MW-2R was installed near the original well's location. The replacement well monitors the same portion of the aquifer as the original monitoring well MW-2.

In October and November of 2002, 12 new monitoring wells were installed at the KHL in accordance with the HMP (BBL 2002c). At the request of MDEQ, five double-cased monitoring wells (MW-8BR, MW-12B, MW-13B, MW-16A, and MW-16B) were installed near the sheetpile wall and seven existing wells (MW-1A, MW-3, MW-8A, MW-12, MW-13, MW-14, and MW-15) were decommissioned and replaced with double-cased monitoring wells (MW-1AR, MW-3AR, MW-8AR, MW-12AR, MW-13AR, MW-14AR, and MW-15AR) in accordance with the HMP (BBL 2002c).

These new wells installed in 2002 and the remaining existing wells (MW-2R, MW-7, and MW-11RR) form the post-remediation groundwater monitoring network. The locations of the groundwater monitoring wells are shown on Figure 4.

⁵Groundwater monitoring conducted from January 1996 to March 1998 was associated with landfill operations. Subsequent groundwater monitoring was conducted pursuant to the RA.

3.1 Well Installation

3.1.1 Monitoring Wells 11 through 15

Mateco Drilling drilled the boreholes for well installation with a Central Mine Equipment Company (CME) 750 all-terrain-vehicle (ATV) drill rig using hollow-stem augers. Soil samples were collected continuously to the base of each borehole with 2-inch by 2-foot long split spoons driven with a 140-pound auto hammer in accordance with American Society for Testing and Materials (ASTM) D-1586-84. The onsite geologist characterized each 2-foot soil sample collected from the boreholes recording soil types, color, sample recovery, penetration resistance (blow counts and N values), moisture content, consistency, and other notable observations in the field logs.

The five new monitoring wells were constructed in accordance with the FSP (BBEPC 1993b). Because the transition from berm to native material was not readily apparent, well screens were placed to straddle the water table, and extend 5 to 7 feet below the water table. MW-11 and MW-12 were each installed with ten-foot screens, approximately five feet above and below the water table. At MW-13, a 5-foot thick silt layer confined the water table, and with the approval of MDEQ oversight, a 5-foot screen was installed and sealed just below the silt. MW-14 and MW-15 were each installed with 7-foot screens extending approximately 5 feet below the water table. The short length above the water table was necessary to allow the screens and bentonite seals to remain at an adequate depth when the berm around Cell 4 was regraded. Groundwater monitoring well construction logs are presented in Appendix K. Monitoring well construction details are summarized in Table 3-1. The new wells were installed and developed two weeks prior to a groundwater sampling event, which was started on July 23, 1998. Each well was pumped and surged repeatedly across the extent of saturated screen length, until the purge water stabilized with relatively low turbidity. Purge volumes ranged between 26 gallons (from MW-15) and 50 gallons (from MW-12). At wells MW-11, MW-12, and MW-13, periodic temperature, pH, and specific conductivity measurements stabilized rapidly. No instrumentation was available to take quantitative field parameters during development of MW-14 and MW-15.

3.1.2 MW-11R

A double-cased groundwater monitoring well was installed between September 30 and October 2, 1998. This well, designated MW-11R, was installed as a replacement for monitoring well MW-11.

The borehole for the installation of MW-11R was drilled with a Gus Pech 1300 ATV drill rig using hollow-stem augers by EDAC. Soil samples were collected continuously from 18 feet below grade to the base of the borehole with 2-inch by 2-foot long split spoons driven with a 140-pound auto hammer in accordance with ASTM D-1586-84. The onsite geologist

3.1 Well Installation

3.1.1 Monitoring Wells 11 through 15

Mateco Drilling drilled the boreholes for well installation with a Central Mine Equipment Company (CME) 750 all-terrain-vehicle (ATV) drill rig using hollow-stem augers. Soil samples were collected continuously to the base of each borehole with 2-inch by 2-foot long split spoons driven with a 140-pound auto hammer in accordance with American Society for Testing and Materials (ASTM) D-1586-84. The onsite geologist characterized each 2-foot soil sample collected from the boreholes recording soil types, color, sample recovery, penetration resistance (blow counts and N values), moisture content, consistency, and other notable observations in the field logs.

The five new monitoring wells were constructed in accordance with the FSP (BBEPC 1993b). Because the transition from berm to native material was not readily apparent, well screens were placed to straddle the water table, and extend 5 to 7 feet below the water table. MW-11 and MW-12 were each installed with ten-foot screens, approximately five feet above and below the water table. At MW-13, a 5-foot thick silt layer confined the water table, and with the approval of MDEQ oversight, a 5-foot screen was installed and sealed just below the silt. MW-14 and MW-15 were each installed with 7-foot screens extending approximately 5 feet below the water table. The short length above the water table was necessary to allow the screens and bentonite seals to remain at an adequate depth when the berm around Cell 4 was regraded. Groundwater monitoring well construction logs are presented in Appendix K. Monitoring well construction details are summarized in Table 3-1. The new wells were installed and developed two weeks prior to a groundwater sampling event, which was started on July 23, 1998. Each well was pumped and surged repeatedly across the extent of saturated screen length, until the purge water stabilized with relatively low turbidity. Purge volumes ranged between 26 gallons (from MW-15) and 50 gallons (from MW-12). At wells MW-11, MW-12, and MW-13, periodic temperature, pH, and specific conductivity measurements stabilized rapidly. No instrumentation was available to take quantitative field parameters during development of MW-14 and MW-15.

3.1.2 MW-11R

A double-cased groundwater monitoring well was installed between September 30 and October 2, 1998. This well, designated MW-11R, was installed as a replacement for monitoring well MW-11.

The borehole for the installation of MW-11R was drilled with a Gus Pech 1300 ATV drill rig using hollow-stem augers by EDAC. Soil samples were collected continuously from 18 feet below grade to the base of the borehole with 2-inch by 2-foot long split spoons driven with a 140-pound auto hammer in accordance with ASTM D-1586-84. The onsite geologist

characterized each 2-foot soil sample collected from the borehole recording soil types, color, sample recovery, penetration resistance (blow counts and N values), moisture content, consistency, and other notable observations in the field logs.

Following installation, MW-11R was developed to remove the fine soil particles. Development was performed by initially surging and bailing the well with a stainless-steel bailer to remove any sediment that may have accumulated at the bottom of the well. Then a pump was lowered into the well and water was pumped from the well at approximately 0.5 gallons per minute. Water quality parameters including temperature, pH, turbidity, dissolved oxygen, and specific conductance were measured periodically during development. Development continued until the measured turbidity was below 5 nephelometric turbidity units (NTUs).

3.1.3 MW-11RR

Residuals were discovered in the berm where MW-11R was located. These residuals were excavated, the area was backfilled, and soil boring SB-11RR was advanced on February 8, 2000 in an initial attempt to install the replacement monitoring well. During the installation of this soil boring, additional residuals were discovered. The area was re-excavated, backfilled, and MW-11RR was installed. MW-11RR consists of a double-cased groundwater monitoring well and was installed on March 3, 2000.

The borehole for the installation of MW-11RR was drilled with a Gus Pech 1000 ATV drill rig using hollow-stem augers by EDAC. Soil samples were collected continuously to the base of the borehole with 2-inch by 2-foot long split spoons driven with a 140-pound auto hammer in accordance with ASTM D-1586-84. The onsite geologist characterized each 2-foot soil sample collected from the borehole recording soil types, color, sample recovery, penetration resistance (blow counts and N values), moisture content, consistency, and other notable observations in the field logs.

The soil boring at the first location (SB-11RR) was abandoned by grouting to the ground surface after encountering residuals. After allowing for construction of an extended ramp to access an alternative drilling location, the drilling crew was remobilized for a second attempt to install the replacement monitoring well. As indicated on the boring log, residuals were also identified at the alternative drilling location for MW-11RR. A permanent 10-inch diameter secondary casing was then installed to a depth of 22.9 feet prior to advancing the boring. The monitoring well was then constructed through the installation of a 5-foot length 2-inch diameter stainless-steel screen and an appropriate length of a stainless-steel riser to extend to the ground surface. Milan Supply Company medium-fine flat surface silica filter sand (Grade 1240)—equivalent to #0 Morie filter sand—was placed in the borehole annulus to 6 inches above the top of the screen. A 3-foot thick hydrated bentonite seal was then installed above the filter sand and extended into the base of the secondary steel casing. The borehole annulus

was filled to a depth of 2 feet below grade with bentonite grout. The well was completed at the ground surface with the installation of a 1-foot thick hydrated bentonite seal and a locking steel protective casing was installed into a concrete collar.

The monitoring well was developed on March 14, 2000 using an inertia pump, tubing with a foot valve, and a surge block to surge and purge a total of 55 gallons. The water yielded from the well after development was clear. The monitoring well boring log and monitoring well construction detail are provided in Appendix K.

3.1.4 MW-2R

In September 2000, BBL personnel performed an inspection of the existing groundwater monitoring network. At that time, the well casing at MW-2 was observed to be broken near the ground surface, and the casing filled with soil. Due to the damage, and the well's compromised integrity, MW-2 was over-drilled with 4¼-inch diameter hollow-stem augers and decommissioned by removing the well casing and backfilling the boring with grout to ground surface.

On October 25, 2000, a 2-inch diameter stainless-steel replacement well (MW-2R) was installed near the original well's location so the replacement well would continue to monitor the same portion of the aquifer as the original MW-2. The subsurface boring logs and monitoring well construction detail are provided in Appendix K.

MW-2R was developed on November 8, 2000 to remove fine particles.

3.1.5 2002 Well Installation Activities

In October and November 2002, Mateco Drilling installed monitoring wells MW-1AR, MW-3AR, MW-8AR, MW-8BR, MW-12AR, MW-12B, MW-13AR, MW-13B, MW-14AR, MW-15AR, MW-16A, and MW-16B using a CME 750 ATV-mounted drill rig. Continuous split-barrel samples were collected from each boring to allow for the visual classification of the subsurface materials. The monitoring wells were constructed as double-cased wells to minimize the potential for introducing PCB-containing particles to the wells during construction. Well installation activities were conducted in accordance with the HMP (BBL 2002c). Modifications to the well installations described within the HMP (BBL 2002c) were discussed in the field, and received MDEQ approval.

Pilot boreholes were drilled at all of the 12 well locations using hollow-stem augers to determine the appropriate installation depth of the steel outer casing for each well. Soil samples were collected continuously to the base of the borehole with 2-inch by 2-foot long split spoons driven with a 140-pound auto hammer in accordance with ASTM D1586-84. The onsite

geologist characterized each 2-foot soil sample collected from the borehole recording soil types, color, sample recovery, penetration resistance (blow counts and N values), moisture content, consistency, and other notable observations in the field logs.

A permanent 10-inch diameter steel outer casing was installed at each well location to the appropriate depth based on depth of fill material observed in the pilot borings. The soil borings were advanced within the 10-inch diameter steel casing, and the monitoring wells were then constructed to the appropriate depth. The monitoring wells were constructed with 5-foot, 7-foot, or 10-foot lengths of 2-inch diameter stainless-steel screen and an appropriate length of a stainless-steel riser to extend to the ground surface. Silica filter sand (equivalent to #0 Morie filter sand) was placed in the borehole annulus to 6 inches above the top of the screen. A hydrated bentonite seal was then installed above the filter sand, and the remainder of the borehole annulus was filled to a depth of one foot below grade with 95% Portland and 5% bentonite slurry grout. The well was completed at the ground surface with a locking steel protective casing installed into a concrete surface pad. Monitoring well construction logs are presented in Appendix K. Monitoring well construction details are presented in Table 3-1. Locations of the groundwater monitoring wells are shown on Figure 4.

The monitoring wells were developed between November 14 and 15, 2002 following the surge and purge well development method using a drill rig. The water yielded from each well after development was clear.

3.2 Monitoring Well and Piezometer Decommissioning

During the weeks of July 13 and 20, 1998 a total of nine groundwater monitoring wells and four piezometers were decommissioned as proposed in the July 7, 1998 BBL letter to MDEQ (Appendix A). Monitoring wells MW-5 and MW-8B were decommissioned by over-drilling both wells to a depth greater than their original boreholes, the screens and casings removed, and the boreholes were tremie grouted to grade with 95% Portland cement and 5% bentonite slurry.

Monitoring wells MW-9A, MW-9B, MW-9R, MW-10A, MW-10B, and MW-10R were decommissioned in a similar fashion, but a different grout composition was used. As described in the July 7, 1998 letter, since these wells were installed through the residuals of Cells 1 and 2, a bentonite slurry was used from grade to the bottom of the residuals, below which conventional grout was used. This modification was necessary to account for the anticipated settlement of the KHL cover and to provide a more flexible seal while the residuals settle.

Monitoring well MW-1 and piezometers GP-3D, GP-3RS, GP-4D, and GP-4RS were inaccessible for over-drilling with an ATV rig. With the approval of MDEQ oversight personnel, these locations were tremie grouted up the riser with a 95% Portland cement/5% bentonite-

slurry ratio. After allowing the grout to cure overnight, riser pipes were broken off just below the grade.

On October 2, 1998, piezometers GP-1D, GP-1RS, GP-2D, and GP-2RS were decommissioned. These piezometers were also inaccessible for over-drilling with an ATV drill rig, so they were decommissioned by filling each well with bentonite slurry, pulling the screen and riser out of the ground, and tremie grouting the remaining hole to grade with a bentonite slurry.

In September 2000, BBL personnel performed an inspection of the existing groundwater monitoring network. At that time, the well casing at MW-2 was observed to be broken near the ground surface, and the casing filled with soil. Due to the damage, and the well's compromised integrity, MW-2 was over-drilled on October 26, 2000 with 4¼-inch diameter hollow-stem augers and decommissioned by removing the well casing and backfilling the boring with 95% Portland cement and 5% bentonite slurry grout to ground surface. Similarly, MW-11 was replaced with MW-11R on September 30 and October 2, 1998. Residuals were observed in the berm where MW-11R was located and soil boring SB-11RR was advanced on February 8, 2000 in an initial attempt to install the replacement monitoring well. During the installation of this soil boring, possible residuals were observed. The area was reexcavated, backfilled, and MW-11RR was installed in clean material. MW-11RR was installed on March 3, 2000.

Between October 22 and 30, 2002, a total of seven monitoring wells were abandoned including: MW-1A, MW-3, MW-8A, MW-12, MW-13, MW-14, and MW-15. The primary abandonment method used involved over-drilling the well with 4¼-inch hollow-stem augers followed by removal of the well materials to the extent possible and tremie grouting the borehole with 95% Portland cement and 5% bentonite slurry grout to the ground surface. Modifications to the well abandonment method were necessary due to rig access difficulty; all modifications were discussed with and approved by the MDEQ's field representative. The method of abandonment for each well is described in the MDEQ abandonment forms. Copies of the MDEQ abandonment forms, well logs, and the well abandonment field notes are included in Appendix L. Four of these wells were modified in 1998 during landfill construction (as discussed in Section 3.4 below), therefore total depth, screen depth, and water table elevations do not correlate between the abandonment forms and well logs. The four wells and modifications are:

- MW-1A was raised 6.95 feet during access road construction (top of casing elevation after modification was 768.95 feet above mean sea level [AMSL]).
- MW-3 was cut 10.19 feet during landfill construction (top of casing elevation after modification was 764.31 feet AMSL).

- MW-14 was cut 8.76 feet during landfill construction (top of casing elevation after modification was 765.05 feet AMSL).
- MW-15 was cut 6.99 feet during landfill construction (top of casing elevation modification was 764.56 feet AMSL).

All soil cuttings generated during well abandonment and the well casing material were containerized within an onsite roll-off container for disposal.

3.3 Monitoring Well Repairs

On October 2, 1998, the protective casings and risers for groundwater monitoring wells MW-3, MW-14, and MW-15 were lowered to accommodate the new elevation of the perimeter road around Cell 4. This was done after the road was regraded by unthreading the existing stainless-steel riser, cutting it approximately 2.5 feet above grade, and installing a new protective casing in a concrete pad around the well.

On October 26, 2000, seven monitoring wells (MW-1A, MW-7, MW-8A, MW-12, MW-13, MW-14, and MW-15) were rehabilitated. Work included installing new surface seals, cutting well casings down, and replacing well caps.

On April 2 and 3, 2003, BBL supervised Mateco Drilling completing repairs to monitoring well MW-13B, which had been damaged during site activities. The steel protective casing and concrete surface seal were removed and soil was excavated around the outer casing to a depth of approximately 5-feet bgs to uncover the bent 10-inch diameter steel outer casing. The bent outer casing and 2-inch diameter stainless-steel well riser were cut and replaced with new casing materials. The stainless-steel riser was reattached using a 2-inch diameter PVC compression coupling, and the steel outer casing was reattached using a 10-inch diameter PVC compression coupling. The excavation was filled and the steel protective well cover was reinstalled within a concrete surface seal.

On April 7, 2003, BBL supervised Mateco Drilling completing repairs to monitoring well MW-2R, which had been damaged during site activities. The steel protective casing and concrete surface seal were removed and soil was excavated around the well casing to a depth of approximately 2-feet bgs to uncover the bent 2-inch diameter stainless-steel riser. The 2-inch diameter stainless-steel well riser was cut and replaced with new stainless-steel riser pipe. The stainless-steel riser was reattached using a 2-inch diameter PVC compression coupling. The excavation was filled and the steel protective well cover was reinstalled within a concrete surface seal. Three steel bollards were installed near the well to protect the well from subsequent damage.

3.4 Geomembrane Liner Boot Installation

During the prefinal inspection, MDEQ requested that Georgia-Pacific construct geomembrane boots around certain groundwater monitoring wells (i.e., MW-1AR, MW-8AR, MW-12AR, MW-12B, and MW-16B) installed in material suspected of containing residuals (see *Pre-Final Inspection Report* [BBL February 2003] located in Appendix A).

In May 2003, a geomembrane liner boot was installed around site monitoring wells MW-1AR, MW-2R, MW-3AR, MW-8AR, MW-8BR, MW-11RR, MW-12AR, MW-12B, MW-13AR, MW-13B, MW-14AR, MW-15AR, MW-16A, and MW-16B. During the May 2003 field activities, it became apparent that when several of the wells near the drip edge of the landfill cover system (i.e., a geomembrane capped area outside of the approximate limits of waste – the approximate limits of waste are shown on Figure 7) were installed, the drip edge geomembrane was damaged. As a result, boots were constructed and liner repairs were made at the nine additional monitoring wells listed above.

An area around each well was excavated, the well and surrounding drip edge geomembrane (if present) were inspected, the boot was installed, and any necessary repairs to the well and/or geomembrane were made. See Figure 7 for a site map. After debris (including concrete) was separated out, each area was backfilled with the excavated materials. The geomembrane liner boots were seam welded to the existing drip edge geomembrane material, where present. Tears and/or holes encountered in the existing drip edge geomembrane material were repaired by extrusion-welding a geomembrane patch over the damaged area. In instances where an existing drip edge geomembrane was not encountered in and around the monitoring wells, the geomembrane liner boot was installed over a prepared pad of the existing subsurface soil. A textured 40-mil LLDPE geomembrane material (Solmax 840 T) was used to construct the liner boots and to patch the drip edge geomembrane. Each completed boot was non-destructively tested using a vacuum box testing method. Installation of the concrete pads around each monitoring well was completed after allowing for settlement of the backfill material. In addition, Mateco Drilling stabilized monitoring well MW-13B and repaired a damaged PVC coupler by installing two saddle clamps around the damaged pipe section. The inner 2-inch casing was not damaged.

BBL field personnel observed the construction of the boots. Specifically, BBL reviewed the geomembrane material's properties and overall condition, observed the fabrication and installation of the liner boots and landfill cover patches, and performed field trial welds for shear and peel strength of seam welds. A detailed discussion of all activities performed at the site, including field notes, photographs, and the results of the field trial welds is included in the Geomembrane Boot Installation Logs (Appendix M).

The activities performed were consistent with the CQAP (BBL 2002b). Although the geomembrane material used was textured (as opposed to the smooth 40-mil LLDPE material in place at the site), the material's properties and condition were similar to the geomembrane material currently used at the site. Based on the similar properties, as well as discussions with MDEQ, the textured material was determined appropriate and acceptable for the activities described above.

4. Response Activities of King Street Storm Sewer

Visible PCB-containing residuals, soils, and sediments from the KSSS floodplain were removed in June 1999 in accordance with the *KSSS Remedial Action Work Plan* (BBL June 1999; Appendix A), which specified methods and procedures for site preparation, residuals excavation, water management, post-excavation verification sampling and analysis, environmental monitoring, and site restoration. Activities associated with each of these components are described below.

Two 18-inch-diameter concrete pipes, determined to be no longer in use, are located approximately 30 feet southeast of the KSSS outfall (see Figures 7 and 8 for location). The pipes were plugged at the pipe ends using concrete block and mortar during the RA summarized herein.

4.1 Site Preparation

Site preparation activities in May and June 1999 consisted of clearing and grubbing of trees and shrubs, construction of temporary access roads and a truck turnaround, and erecting erosion and sedimentation control structures. A silt curtain was erected as a temporary erosion and sedimentation control. As noted in Section 2.3.1, this curtain was obtained from another site and was decontaminated prior to being deployed during the RA activities.

4.1.1 Clearing and Grubbing

Approximately half an acre of woody vegetation, including trees and shrubs, within the limits of excavation was removed, as necessary. Tub grinding of trees and stumps was completed in June 1999. The cleared and chipped materials were transported to Cell 4 to be used as backfill material and were mixed with the residuals in the south corner of Cell 4 for stabilization (as directed by USEPA in a May 29, 1998 meeting; Appendix A).

4.1.2 Access Road Construction

Temporary access roads were built in May 1999 to connect the removal area at the KSSS to the top of the berm on the western side of Cell 1. The roads were constructed of a geotextile overlain with gravel. A temporary access road was also built through the neighboring scrap yard, allowing dump trucks an alternative route to the site. A truck turnaround was built at the western side of Cell 1 to accommodate truck traffic coming out of the KSSS area.

4.1.3 Erosion and Sedimentation Controls

Temporary erosion and sedimentation controls consistent with the EDR (BBL June 2002; Appendix A) and ESCP (BBL 2002a) were installed during the RA activities at the KSSS. These controls consisted of sheetpiling, silt fencing, and a silt curtain.

Silt Fence – Approximately 1,100 linear feet of silt fencing were installed beginning in June 1999 along the inside edge of the sheetpile wall and along the west, south, and east sides of the KSSS floodplain (Figure 8).

Silt Curtain – A silt curtain running approximately 330 linear feet along the river was installed before work activities began (Figure 8). In addition, a curtain approximately 130 linear feet in length was placed along the storm sewer outfall channel (Figure 8).

Sheetpiling – Temporary sheetpiling was installed to enclose the excavation area. Sheetpiling was installed along the Kalamazoo River edge between the KSSS outfall channel and the western limits of excavation, as well as along the western edge of the storm sewer outfall channel (Figure 8). Geocon installed approximately 350 linear feet of sheetpiling, under a subcontract to TECC, in June 1999. The sheetpiling was driven using a Hoe-Pac and 17.5-, 20-, and 30-foot sheets, depending on the location. The sheets were driven so that approximately 4 feet of freeboard was created between the river and the excavation area.

4.2 Excavation Activities

Between June 11 and 30, 1999, a total of approximately 5,000 cy of visible residuals, soils, and sediments from the KSSS floodplain were excavated and placed into Cell 4. All visible residuals were excavated from the KSSS. The approximate final limit of excavation activities is shown on Figure 8. Imported clean fill material was brought onto the site to be used as backfill for the KSSS excavation activities.

Excavation activities began on June 11, 1999 along the southern property line next to the KMR property. To minimize water from entering the excavation area, a 10-foot strip of shoreline was left in place along the interior edge of the sheetpiling, and backfilling was initiated immediately. This 10-foot strip area along the sheetpiling was excavated at the conclusion of the KSSS excavation activities.

On June 15, 1999, prior to the start of excavation in the KSSS outfall channel, a sump and pumps were installed including a bypass pump used to route the outfall flow from the KSSS outfall around the excavation to the Kalamazoo River.

During excavation on June 19, 1999, two 18-inch diameter concrete pipes were discovered, instead of the 48-inch diameter pipe that was originally thought to exist. Both pipes were determined to be no longer in use, as verified by the City of Kalamazoo (documented in the field notes in Appendix B), and were plugged at the pipe ends using concrete block and mortar on June 22, 1999 (see February 5, 2002 letter from Terra Contracting included in Appendix A).

Excavated materials observed to contain free water were gravity dewatered and mixed with sand and/or inert fly ash as necessary before being placed into vehicles and transported to Cell 4. Materials not containing free water were placed directly into vehicles for transport to Cell 4 for consolidation.

4.3 Verification Sampling and Analysis

As prescribed in the *KSSS Remedial Action Work Plan* (BBL June 1999; Appendix A), verification sampling and analysis were conducted to determine if the cleanup standard of 1 milligram per kilogram (mg/kg) (as specified in the KHL OU ROD and AOC) was met. Verification sampling locations and sample numbers were determined based on the Guidance Document for Verification of Soil Remediation (MDNR 1994). Samples were collected from native soil below the vertical extent of excavation (0 to 0.5-foot) based on a sampling grid determined in the field.

4.3.1 Field Sampling and Laboratory Analysis

KAR Laboratories analyzed verification samples. PCB analyses were performed in accordance with *USEPA Method 8082* (USEPA 1996). As prescribed in the *KSSS Remedial Action Work Plan* (BBL June 1999; Appendix A), 10% of samples were also analyzed for constituents on the Target Compound List and Target Analyte Lists (TCL/TAL). Methods for sample collection, sample handling and custody, and quality control measures were in accordance with requirements presented in Appendix A of the FSP (BBEPC 1993b).

As prescribed in the *KSSS Remedial Action Work Plan* (BBL June 1999; Appendix A), verification sampling and analysis was conducted on the floor and sidewalls of the excavation to verify that any PCBs remaining in the soils at the KSSS were less than 1 mg/kg. If the analytical results indicated that the total PCB concentration at a discrete sampling location was less than 1 mg/kg, the limit of excavation was considered attained and no additional excavation was performed. If the field screening or analytical results indicated that the total PCB concentrations were above 1 mg/kg, a 20-foot by 20-foot area around the sample location was re-excavated and resampled until the PCB concentration was below 1 mg/kg.

Thirteen soil verification samples (Z18017 through Z18029) (Figure 8) were collected in June 1999 during excavation activities at the KSSS and analyzed for PCBs. Except for one detect

(2.1 mg/kg) at Z18021, all soil samples were below the detection limit of 0.33 mg/kg. On June 30, 1999, sample location Z18021 was re-excavated, all visible residuals were removed, and another verification sample was collected (Z18029). PCBs were not detected in this sample. Laboratory results are summarized in Table 4-1 and included in Appendix N-1.

Two verification samples (Z18026 and Z18027) (Figure 8) collected on June 22, 1999 were analyzed for TCL/TAL constituents. The analytical results for TCL/TAL constituents are summarized in Table 4-2. Laboratory results are included in Appendix N-1.

4.4 Transportation

Excavated materials were transported along the access road between the KHL and the Kalamazoo River to Cell 4. The transportation route was consistent with that presented in Appendix G of the EDR (BBL June 2002; Appendix A).

4.5 Water Treatment

Water from RA activities at the KSSS was pumped to the onsite water treatment system. The water was treated, sampled, and stored in frac tanks until analytical results indicated that discharge was in accordance with the SRD (Part I, Section A, Limitations and Monitoring Requirements) (MDEQ July 1998; Appendix H). Refer to Section 2.5 for additional information regarding the onsite water treatment system.

4.6 Environmental Monitoring

Environmental monitoring was conducted throughout the RA activities at the KSSS, including dust monitoring and high-volume air monitoring. Turbidity monitoring and water column sampling were conducted during the excavation of materials from the KSSS floodplain, as prescribed in the AOC (Appendix A). Each activity is discussed below.

4.6.1 Dust Monitoring

Dust monitoring conducted by TECC and BBL during RA activities consisted of both visual inspection of the site for airborne particles and monitoring via a Mini-Ram dust monitor. Dust monitoring was conducted at the locations shown on Figure 2. The action level for suspended particulates was 150 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) in compliance with the National Ambient Air Quality Standard (NAAQS). If the action level was attained, or visual inspection deemed a response was necessary, control measures were instituted in compliance with the *KSSS Remedial Action Work Plan* (BBL June 1999; Appendix A). Control measures included watering of source areas (e.g., roads, excavation faces), maintaining slower vehicle traffic on

dirt roads, and/or terminating activities until corrective action was implemented. Dust monitoring data are included in Appendix O.

4.6.2 Air Monitoring

The *KSSS Remedial Action Work Plan* (BBL June 1999; Appendix A) prescribed high-volume air sampling for PCBs to be performed throughout the RA activities. The methods for monitoring were as described in a letter to MDEQ dated January 15, 1999 (Appendix A), and as approved by MDEQ in a letter dated February 9, 1999 (Appendix A). High-volume air sampling was implemented throughout the RA activities at the KSSS at the three locations shown on Figure 2. The action levels for PCBs were $0.2 \mu\text{g}/\text{m}^3$ for the north and southwest monitoring locations (G1 and H1, respectively) and $0.02 \mu\text{g}/\text{m}^3$ for the southeast monitoring location (H2), which is in closer proximity to King Highway.

The air monitoring program followed the procedures outlined by MDEQ in a December 11, 1998 facsimile (Appendix A). *USEPA Method TO-4A from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air* (USEPA 1999) was the procedure followed for sample collection and analysis. Samples were collected during the entire workday except during periods of mechanical failure prohibiting the use of the air monitoring equipment.

Fifty-eight air samples were collected by BBL and analyzed for PCBs by KAR Laboratories during the RA. Results indicate the samples were below detectable levels for the duration of the RA activities. The results of all the air monitoring activities – including samples taken during other components of the RA at the KHL OU – are included in Table 4-3 and in Appendix P. Corresponding meteorological data are found in Appendix Q.

The Air Quality Division of MDEQ approved the termination of air monitoring for PCBs at the KHL on November 3, 1999 (as referenced in November 3, 1999 correspondence from BBL to MDEQ, see Appendix A).

4.6.3 Turbidity Monitoring and Water-Column Sampling

Turbidity monitoring and water-column sampling were conducted as specified in the *Remedial Action Turbidity Monitoring Plan* (BBL July 1999; Appendix A) during the RA activities at the KSSS. The purpose of this monitoring was to assess the impacts of the excavation activities, if any, on surface water quality, and to provide a mechanism to evaluate the effectiveness of erosion control measures. Monitoring included sampling and analyses for TSS and PCBs. As prescribed in the *Remedial Action Turbidity Monitoring Plan* (BBL July 1999; Appendix A), measurements of turbidity were made in the Kalamazoo River approximately 100 feet upstream and 100 feet downstream of the work area. Turbidity measurements were collected daily, two hours into each shift at mid-river depth of the Kalamazoo River. One water-column

sample was collected for PCB analysis at each of the turbidity monitoring locations at the same time turbidity was measured. The turbidity action level was a 25% increase in the downstream samples above the upstream samples. PCBs were analyzed by *USEPA Method 8082* (USEPA 1996) with a MDEQ Target Detection Limit of 0.2 µg/L.

Turbidity monitoring and water-column sampling were conducted only on days when excavation activities were performed adjacent to the Kalamazoo River or in the KSSS outfall channel. In total, ten upstream and ten downstream measurements were collected. All turbidity results were below the action level during the KSSS RA activities. The monitoring results are summarized in Table 4-4.

In total, fourteen water-column samples were collected and analyzed for PCBs by KAR Laboratories; all results were below the MDEQ Target Detection Limit of 0.2 µg/L. The laboratory analytical results are included in Appendix R-1.

4.7 Site Restoration

Following excavation at the KSSS and assessment of verification sampling results, the excavated area was backfilled with imported clean material. The area was compacted and graded to the final elevations shown on Figure 9. A vegetation layer was placed on July 14 and 15, 1999 and hydroseeding was completed on July 19, 1999. As discussed in the *Pre-Final Inspection Report* to MDEQ (BBL February 2003; Appendix A), MDEQ requested clarification on the thickness of topsoil placed on the KSSS area. Clarification is necessary because approximately 6 inches of topsoil was placed over the clean material used to bring the excavation up to existing grade, as opposed to 12 inches of topsoil as described in the *Revised KSSS Work Plan* (BBL June 1999; Appendix A). The initial draft of the *KSSS Work Plan* (BBL April 1999; Appendix A) indicated that 6 inches of topsoil would be placed over the clean backfill material. Comment Number 3 in MDEQ's May 21, 1999 response to the draft Work Plan (Appendix A) stated that the excavated area was to be backfilled with a minimum of 12 inches of clean material; no comment was made about the topsoil layer. Although the *Revised KSSS Work Plan* (BBL June 1999; Appendix A) prescribed a 12-inch thick topsoil layer be placed over the clean fill materials, this was not the original intent, and the 12-inch topsoil layer was not requested by MDEQ.

Approximately 550 linear feet of riprap, 5 feet wide and 9 inches thick, were placed on top of a geotextile along the Kalamazoo River and on both sides of the storm sewer outfall channel (Figure 9). The riprap layer will serve as a permanent form of erosion and sedimentation control and was placed to protect the regraded soils from river-induced erosive forces. It will also enhance amphibian habitat.

5. Response Activities in Areas Abutting Adjacent to the KHL

Visible PCB-containing residuals and sediments along the Kalamazoo River adjacent to the KHL were removed from August 4 to October 4, 1999. The scope of these activities was originally outlined in the *Residuals Removal Work Plan for Areas Adjacent to KHL* (BBL August 1999; Appendix A).

5.1 Residuals Delineation

Sediment and soil probing activities were conducted in the river along the sheetpile wall on June 30, 1999 in accordance with the *Sediment Probing Work Plan* that BBL submitted to MDEQ on June 2, 1999 (revised on June 21, 1999) (Appendix A). Probing was conducted to evaluate the extent of visible residuals in the Kalamazoo River adjacent to the KHL. Figure 10 shows the sediment and soil probing locations. Probing indicated that residuals were located primarily in a continuous layer in the western end of the area adjacent to Cell 1 of the KHL (transects 0 + 00 to 1 + 40), and in apparently smaller discrete areas elsewhere along the sheetpile wall (Figure 10). Results of these sediment probing activities are discussed in a letter dated July 26, 1999 to MDEQ (Appendix A). Further investigation of this area outside of the river indicated that residuals were also located at the western end of the perimeter berm behind the sheetpile wall and below the existing riprap (Figure 10).

5.2 Site Preparation

Site preparation activities in July 1999 consisted of the installation of erosion and sedimentation controls and the construction of temporary access roads.

5.2.1 Erosion and Sedimentation Controls

Temporary erosion and sedimentation controls consistent with the EDR (BBL June 2002; Appendix A) and ESCP (BBL 2002a) were installed during the RA activities at the areas adjacent to the KHL. These controls consisted of silt fencing and a silt curtain.

Silt Fence – Silt fencing was installed in July 1999 along the work area within 10 feet of the sheetpile wall (Figure 10)

Silt Curtain – Approximately 700 linear feet of silt curtain were installed in July 1999 along the work area within 10 feet of the sheetpile wall (Figure 10)

5.2.2 Access Roads

To gain access to the area at the western end of the sheetpile wall, imported clean fill was used to construct a temporary access ramp southeast of the KSSS outfall.

5.3 Excavation Activities

Visible residuals and sediment along the Kalamazoo River in the area directly adjacent to the KHL and from within the perimeter berm behind the sheetpile wall were excavated, then transported and consolidated at Cell 4. Approximately 6,000 cy of visible residuals and soils were excavated (5,000 cy from within the perimeter berm and 1,000 cy from the Kalamazoo River) between August and October 1999. The final limits of excavation are shown on Figure 10.

Excavation of visible materials began on August 4, 1999. Work proceeded from station 2+00 (Figure 10) and continued west toward the KSSS outfall in two phases. The first phase was from station 2+00 to 0+40; the second phase from station 0+40 to 0+00. Excavation within the perimeter berm behind the sheetpile wall and below the riprap began on August 10, 1999.

Spot removal of visible residuals east of station 2+00 began on September 2, 1999. As shown on Figure 10, intermittent areas along the sheetpile wall contained visible residuals prior to excavation. Work in the river began at the eastern limits of the excavation outside the sheetpile wall at station 7+00. Excavation activities continued in all directions to determine the extent of the visible residuals. A vacuum tanker, an 85-gallon metal drum with the bottom cut out in serrated fashion, and a 4-foot-by-8-foot steel box 4 feet deep were used to maintain a dry excavation for visual identification of residuals, depending on location and river level. This facilitated the removal of the isolated visible residuals by vacuuming inside the drum or box down to native soil. Once the area was determined clean by visual observation, excavation activities proceeded to the next location containing visible residuals. An area containing residuals was excavated from the Kalamazoo River along the length of the sheetpile wall from station 0+00 to station 6+55. An area at station 7+00, which contained residuals, was also excavated.

5.4 Verification Probing and Backfilling

On October 4, 1999 with MDEQ oversight, post-excavation probing was conducted in the Kalamazoo River in areas adjacent to the sheetpile wall chosen by MDEQ to verify complete removal of visible residuals. This interim removal action was determined complete by MDEQ except for two locations, stations 2+00 and 6+20, which contained less than 1 inch of residuals. Following re-excavation of these two stations (see Figure 10) with MDEQ oversight on October

4, 1999, MDEQ verbally approved backfilling the area with clean sand and riprap (documented in the field notes included in Appendix B).

5.5 Transportation

Excavated materials were transported along the access road between the KHL and the Kalamazoo River to Cell 4 via vacuum tankers. The transportation route was consistent with that presented in Appendix G of the EDR (BBL June 2002; Appendix A).

5.6 Water Treatment

Water resulting from RA activities was transported to the onsite water treatment system. The water was treated, sampled, and stored in frac tanks until analytical results indicated that discharge was appropriate in accordance with the SRD (Part I, Section A, Limitations and Monitoring Requirements) (MDEQ July 1998; Appendix H). Refer to Section 2.5 for additional information regarding the onsite water treatment system.

5.7 Environmental Monitoring

Environmental monitoring, which included dust monitoring and high-volume air sampling, was conducted throughout the RA activities. Turbidity monitoring and water column sampling were conducted during the excavation of materials from the Kalamazoo River, as prescribed in the AOC (Appendix A). Each activity is discussed below.

5.7.1 Dust Monitoring

Dust monitoring was conducted daily by TECC and BBL during RA activities and consisted of both visual inspection of the site for airborne particles and monitoring via a Mini-Ram dust monitor. Dust monitoring was conducted at the locations shown on Figure 2. The action level for suspended particulates was $150 \mu\text{g}/\text{m}^3$ in compliance with the NAAQS. If dust levels reached the action level, or visual inspection deemed it necessary, control measures were instituted in compliance with the *Residuals Removal Work Plan for Areas Adjacent to KHL* (BBL August 1999; Appendix A). Control measures included watering of source areas (e.g., roads, excavation faces), maintaining slower vehicular traffic on dirt roads, and/or terminating activities until corrective actions were taken. Dust monitoring logs are included in Appendix O.

5.7.2 Air Monitoring

As prescribed in the *Residuals Removal Work Plan for Areas Adjacent to KHL* (BBL August 1999; Appendix A), monitoring of PCBs in air was performed throughout RA activities as described in a letter to MDEQ dated January 15, 1999 (Appendix A), and approved by MDEQ

in a letter dated February 9, 1999 (Appendix A). High-volume air sampling was implemented by BBL throughout the RA activities at the areas adjacent to the KHL at the three locations shown on Figure 2. The PCB action levels were $0.2 \mu\text{g}/\text{m}^3$ for the north and southwest monitoring locations (G1 and H1, respectively) and $0.02 \mu\text{g}/\text{m}^3$ for the southeast monitoring location (H2), which is in closer proximity to King Highway.

The air monitoring program followed the procedures outlined by MDEQ in a December 11, 1998 facsimile (Appendix A). *USEPA Method TO-4A from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air* (USEPA 1999) was the procedure followed for sample collection and analysis. Samples were collected during the entire workday during RA activities at the areas adjacent to the KHL except during periods of mechanical failure.

A total of 196 air samples were collected by BBL and analyzed for PCBs by KAR Laboratories during the RA. Except for five detections, all results were below detectable levels for the duration of the RA activities. The results of all the air monitoring activities – including samples taken during other components of the RA at the KHL OU and Mill Lagoons are included in Table 4-3 and in Appendix P. When airborne PCBs were detected, MDEQ was notified within 24 hours (verbally, via phone), and corrective actions were taken. MDEQ was also forwarded laboratory analytical results on a weekly basis (or as soon as they became available) along with a cover letter summarizing the results. The following table lists the date of each of the five air monitoring detections, the associated air sample concentration, and a summary of the corrective action taken.

Air Sample Collection Date	Air Sample Concentration ($\mu\text{g}/\text{m}^3$)	Corrective Action Taken
August 30, 1999	0.03	The contractor and MDEQ were verbally notified of the detection on September 3, 1999 (results were reported by the laboratory on that date) and engineering controls (i.e., dust suppression in Cell 4) were initiated. The data package was sent to MDEQ on September 8, 1999 (Appendix A). Air samples collected on the following day (August 31, 1999) were all at concentrations below the detection level.
September 15, 1999	0.02	The contractor and MDEQ were verbally notified of the detection on September 23, 1999 (results were reported by the laboratory on that date), and the data package was sent to MDEQ on September 30, 1999 (Appendix A). Air samples collected on the following day (September 16, 1999) were all at concentrations below the detection level.

Air Sample Collection Date	Air Sample Concentration ($\mu\text{g}/\text{m}^3$)	Corrective Action Taken
September 17, 1999	0.02	The contractor and MDEQ were verbally notified of the detection on October 1, 1999 (results were reported by the laboratory on that date), and the data package was sent to MDEQ on October 4, 1999 (Appendix A). Air samples collected on the following day (September 18, 1999) were all at concentrations below the detection level.
September 24, 1999	0.02	The contractor and MDEQ were verbally notified of the detection on October 1, 1999 (results were reported by the laboratory on that date), and the data package was sent to MDEQ on October 5, 1999 (Appendix A). Air samples collected on the following day (September 25, 1999) were all at concentrations below the detection level.
September 28, 1999	0.03	The contractor and MDEQ were notified of the detection on October 5, 1999 (sample results were reported on October 4, 1999), and as a corrective action, the site was watered down to aid in dust control (as documented in an October 8, 1999 letter to MDEQ). The data package was sent to MDEQ on October 8, 1999 (Appendix A). Air samples collected on the following day (September 29, 1999) were all at concentrations below the detection level.

RA activities in the areas directly adjacent to the KHL were performed concurrent with other RA activities associated with the KHL OU and Mill Lagoons. Therefore, the five air monitoring detections may not have been caused by activities associated with the removal of residuals from the areas directly adjacent to the KHL. The results of the air sampling activities are included in Appendix P. Meteorological data associated with air quality are found in Appendix Q.

5.7.3 Turbidity Monitoring and Water-Column Sampling

Turbidity monitoring and water-column sampling were conducted as specified in the *Remedial Action Turbidity Monitoring Plan* (BBL July 1999; Appendix A) during the RA activities at the areas directly adjacent to the KHL. The purpose of turbidity monitoring was to assess the impacts of the excavation activities, if any, on surface water quality, and to provide a means to evaluate the effectiveness of erosion control measures. Turbidity monitoring included analyses for TSS and PCBs. As prescribed in the *Remedial Action Turbidity Monitoring Plan* (BBL July 1999; Appendix A), the measurements of turbidity were collected in the Kalamazoo River approximately 100 feet upstream and 100 feet downstream of the work area. Turbidity measurements were collected daily two hours into each shift, at mid-river depth. Water-column samples were collected at both of the turbidity monitoring locations. One water-column sample was collected from both of the turbidity monitoring locations at the same time that the turbidity was monitored and analyzed for PCBs. An action level criterion of 25% variance between the upstream and downstream samples was applied for turbidity. PCB analysis was performed in

accordance with *USEPA Method 8082* (USEPA 1996) and had a practical quantitation limit (PQL) of 0.1 µg/L.

Turbidity monitoring and water-column sampling were conducted only on days when excavation activities were performed adjacent to the Kalamazoo River. Turbidity monitoring conducted during the RA activities yielded 18 upstream and 18 downstream measurements. All turbidity results were below the action level for the full extent of the RA activities. The monitoring results are summarized in Table 5-1.

Twenty-seven water-column samples were collected and analyzed for PCBs by KAR Laboratories; all results were below the MDEQ Target Detection Limit of 0.2 µg/L. The laboratory analytical results are included in Appendix R-2.

5.8 Site Restoration

Following removal of the residuals and verification probing in the Kalamazoo River in October 1999, the excavated areas were backfilled using an imported clean material, followed by a layer of geotextile. Approximately 700 linear feet of riprap, 5 feet wide and 9 inches thick, was placed in the Kalamazoo River along the sheetpile wall adjacent to the KHL in the excavated areas to protect the regraded soils from river-induced erosive forces. Areas within the perimeter berm were covered with 6 inches of topsoil and seeded in the summer of 2000.

6. Response Activities at Georgia Pacific Mill Lagoon and Adjacent Floodplain Area

Visible PCB-containing residuals, soils, and sediment from the Mill Lagoons and the floodplain area adjacent to Mill Lagoons 1, 2, and 3 (floodplain area) were removed in accordance with the *Remedial Action Work Plan – Georgia-Pacific Mill Lagoons* (BBL June 1999; Appendix A). The work plan specified methods and procedures for site preparation, residuals excavation, and other removal activities as well as water management, post-excavation verification sampling and analysis, environmental monitoring, and site restoration. Activities for each of these components are described below.

6.1 Site Preparation

Site preparation activities began at the Mill Lagoons in October 1998 and consisted of clearing and grubbing of trees and shrubs, constructing temporary access roads and a truck turnaround, erecting erosion and sedimentation control structures, and erecting site security controls. Site preparation activities began in the floodplain area adjacent to the Mill Lagoons in June 1999, and consisted of clearing and grubbing of trees and shrubs and erecting additional erosion and sedimentation control measures.

6.1.1 Clearing and Grubbing

Areas within the limits of excavation at Mill Lagoons 1, 2, and 3 were cleared and grubbed of trees and shrubs in October 1998. Mill Lagoon 4 was cleared and grubbed in March 1999, and Mill Lagoon 5 was cleared and grubbed in July 1999. The floodplain area was cleared and grubbed in June 1999. The cleared materials were chipped with a tub-grinder and transported to Cell 4 to be mixed with residuals for stabilization.

6.1.2 Access Road Construction

Approximately 1,500 linear feet of temporary access roads were built beginning in October 1998 around the lagoons to connect to the existing mill service roads. Construction of the temporary access roads consisted of installing a geotextile over a graded surface, placing and compacting 12 inches of bank-run gravel, and placing another geotextile overlain with an additional 12 inches of road gravel. Truck turnaround and backfill staging areas were also built to accommodate truck traffic entering and leaving the lagoon area and to stockpile backfill materials, as necessary.

6.1.3 Erosion and Sedimentation Controls

Temporary erosion and sedimentation controls consistent with the EDR (BBL June 2002; Appendix A) and ESCP (BBL 2002a) were installed during RA activities at the Mill Lagoons and floodplain area. The controls consisted of silt fencing and silt curtains.

Silt Fence – Approximately 400 linear feet of silt fencing was installed in October 1998 between the edge of the Kalamazoo River and the excavation areas (Figure 11)

Silt Curtain – Approximately 400 linear feet of silt curtain were installed in the Kalamazoo River along the eastern edge adjacent to the Mill Lagoons in June 1999 (Figure 11)

6.1.4 Site Security Controls

As documented in the February 5, 2002 letter from Steve Taplin of Terra Contracting (Appendix A), a 6-foot tall chain-link fence, equipped with three strands of barbed wire at the top, was installed at the Mill Lagoons. The fence extended across the railroad trestle to block access from Riverside Park (as agreed upon and documented in a June 29, 1999 letter to MDEQ; Appendix A).

6.2 Excavation Activities at the Mill Lagoons

Between November 1998 and September 1999, visible residuals and soils from the Mill Lagoons were excavated, transported to Cell 4, and consolidated. Approximately 33,000 cy of residuals were excavated, stabilized, and consolidated into Cell 4. The final limits of excavation are shown on Figures 11 and 12.

The lagoons were excavated down to native soils. Excavation activities began south of Mill Lagoon 3 in early November 1998. Excavation continued through December 1998 with the removal of residuals from Mill Lagoons 1, 2, and 3 and from the berms between the lagoons. Mill Lagoon 4 was excavated in June 1999, and Mill Lagoon 5 was excavated in August and September 1999.

In addition to the Mill Lagoons, several soil piles adjacent to Mill Lagoons 1, 2, and 3, as well as debris (e.g., concrete, drainage pipes, and tree stumps) located in the lagoons, were removed and transported to Cell 4. The utility pole located south of Mill Lagoon 3 was relocated during excavation activities (Figures 11 and 13).

During excavation activities in November 1998 at the eastern end of Mill Lagoon 1, 10 metal drums were discovered beneath the soil (Figure 11). Nine of the drums were empty; one of the drums containing free liquids was overpacked, and all the drums were placed into a roll-off for

offsite disposal. Eight samples were collected and submitted for analytical testing by CT&E. Analytical results indicated that the materials were nonhazardous. Laboratory results are included in Appendix S.

Two abandoned clarifiers were unearthed at the east end of Mill Lagoon 1 (Figure 11). The first clarifier was discovered on December 4, 1998, and was located 50 feet east of Mill Lagoon 1. The second clarifier, located immediately east of the first clarifier, was discovered on December 8, 1998. The contents of both clarifiers were removed in December 1998 and transported to Cell 4 for consolidation and disposal, and backfilling was completed in October 1999.

6.3 Excavation Activities at the Floodplain Area

Visible PCB-containing residuals, soils, and sediments from the floodplain area were excavated, transported to Cell 4, and consolidated. Because the work at the floodplain area (i.e., excavation and consolidation) was considered an interim response action, only a visual cleanup criterion was required (as described in the AOC; Appendix A); however, MDEQ did conduct verification sampling. The laboratory analytical data are included in Appendix N-2 and are discussed in Section 6.7. Excavation activities were conducted between July and September 1999. Approximately 5,000 cy of residuals were excavated, stabilized with inert fly ash, and consolidated into Cell 4. The final limits of excavation are shown on Figure 11.

Excavation activities at the floodplain area were conducted to the edge of the Kalamazoo River, which at the time of RA activities was approximately 753 feet mean sea level (msl). This RA activity exceeded the requirements of Item II, G of the SOW, which described removal action based on 755 AMSL and a 10-foot buffer from the edge of the river to the starting boundary of excavation.

The floodplain area was excavated down to native soils. Once the RA activities were complete, (i.e., all visible residuals were excavated), the excavated area was backfilled, vegetated, and a 5-foot-wide, 6-inch-thick layer of riprap was installed along the Kalamazoo River.

6.4 Transportation

Excavated materials were placed into dump trucks for transport to Cell 4 for disposal. Fly ash and sand were used to solidify excavated materials as needed. Excavated residuals observed to contain free water were gravity dewatered as needed before being placed into vehicles and transported to Cell 4. The vehicles, before leaving the Mill Lagoons to travel to KHL OU, were passed through the wheel wash for decontamination. Excavated materials were transported southeast through the Georgia-Pacific mill property to King Highway, and west across the

Kalamazoo River via the King Highway Bridge to Cell 4 of the KHL. The route was consistent with that presented in Appendix G of the EDR (BBL June 2002; Appendix A).

6.5 Water Treatment

Water resulting from RA activities was pumped to the onsite water treatment system. The water was treated, sampled, and stored in frac tanks until analytical results indicated that discharge was appropriate in accordance with the SRD (Part I, Section A Limitations and Monitoring Requirements) (MDEQ July 1998; Appendix H). Refer to Section 2.5 for additional information regarding the onsite water treatment system.

6.6 Mill Lagoon Verification Sampling and Analysis

As prescribed in the *Remedial Action Work Plan – Georgia-Pacific Mill Lagoons* (BBL June 1999; Appendix A), verification of soil remediation was conducted at the Mill Lagoons. Verification sampling frequency and locations were selected based on the *Guidance Document for Verification of Soil Remediation* (MDNR 1994). Samples were collected from native soil (at 0 to 0.5-foot intervals) below the extent of excavation based on the sampling grids determined in the field. Approximate locations of verification sampling are shown on Figures 11 and 12. Verification sampling locations were selected as recommended in the *Guidance Document for Verification of Soil Remediation* (MDNR 1994). In addition, Appendix T includes independent calculations that support the basis for the sampling frequency, and confirm that the verification sampling was conducted pursuant to the *Guidance Document for Verification of Soil Remediation* (MDNR 1994).

6.6.1 Field Screening and Laboratory Analysis

KAR Laboratories analyzed verification samples for Mill Lagoons 1, 2, 3, 4, and 5. Samples collected from the area south of Mill Lagoon 3 were field screened using an EnSys Corporation field test kit (EnSys kit) (Appendix N-3). Three samples were sent for laboratory analysis at Savannah Laboratories (Appendix N-3). PCB analyses were performed using *USEPA Method 8082* (USEPA 1996). As prescribed in the *Remedial Action Work Plan – Georgia-Pacific Mill Lagoons* (BBL June 1999; Appendix A), 10% of samples were also analyzed for TCL/TAL constituents (6 of the 46 total verification samples collected at the Mill Lagoons were analyzed for TCL/TAL constituents). The analytical results for TCL/TAL constituents are summarized by sample in Table 6-1. Methods for collection, sample handling and custody, and quality control measures were in accordance with requirements presented in the FSP (BBEPC 1993b).

6.6.2 Evaluation of Verification Sampling Analytical Data

As prescribed in the *Remedial Action Work Plan – Georgia-Pacific Mill Lagoons* (BBL June 1999; Appendix A), verification sampling and analysis was conducted on the floor and sidewalls of each excavated area to verify that PCB concentrations remaining in soils at the Mill Lagoons were less than the MDEQ-specified cleanup criterion of 9.9 mg/kg. If the analytical results indicated that the total PCB concentration at a discrete sampling location was less than 9.9 mg/kg, the limit of excavation was considered attained, no additional excavation was performed, and the area was backfilled. If the analytical results indicated that the total PCB concentration was above 9.9 mg/kg, an area around that sample location was re-excavated (removing an average of 20 cy) and resampled until the PCB concentration was below 9.9 mg/kg.

Laboratory results collected by BBL are included in Appendix N-4. MDEQ laboratory verification results are included in Appendix N-2.

Mill Lagoons 1, 2, and 3

Fourteen verification samples were collected from Mill Lagoons 1, 2, and 3 (Figure 11) in July and August 1999 (G52057 through G52070). The minimum number of verification samples required to be collected and analyzed as specified in the *Guidance Document for Verification of Soil Remediation* (MDNR 1994) was 12 or 25% of the total number of grid nodes, whichever is larger. The 42-foot sampling grid interval agreed upon with MDEQ (refer to the June 29, 1998 and May 25, 1999 letters to MDEQ, both included in Appendix A), resulted in a total of 56 grid nodes. As such, 14 (25% of 56) verification samples were collected (the larger number of the two). All samples were below the MDEQ-specified cleanup criterion of 9.9 mg/kg. The arithmetic mean PCB concentration and 95% upper confidence level (UCL) were 0.23 and 0.30 mg/kg, respectively. A summary of the analytical laboratory results and statistical analysis is provided in Table 6-2.

Based on verbally-reported results of MDEQ soil verification sampling (ML SW-N-1 through ML SW-E-17) in the area of Mill Lagoons 1, 2, and 3, certain areas within the Mill Lagoons were re-excavated in September 1999 (Figure 11). Three locations within the Mill Lagoons were re-excavated, removing an average of 20 cy and all visible residuals from each location. The analytical results of verification sampling conducted following re-excavation (G52095, G52096, G52097, and G52103 through G52107) indicated that the samples collected were below the MDEQ-specified cleanup criterion of 9.9 mg/kg. Results are summarized in Table 6-3.

In accordance with the *Remedial Action Work Plan – Georgia-Pacific Mill Lagoons* (BBL June 1999; Appendix A), verification samples G52108 through G52111 (Figure 11) from Mill

Lagoons 1, 2, and 3 were analyzed for TCL/TAL constituents. The analytical results for TCL/TAL constituents by sample are summarized in Table 6-1.

Based on the results of two MDEQ PCB soil verification samples from locations north of the fence line (outside of the Mill Lagoon property boundary) to the northwest of Mill Lagoon 1 (ML OF-6 – 16 mg/kg; ML OF-7 – 28 mg/kg; see Figure 11 for locations), additional excavation work was completed in this area. Approximately 100 cy of materials were removed on September 16, 1999, and the excavation activities were observed by an MDEQ representative (refer to September 16, 1999 field notes contained in Appendix B). Due to the proximity of the Kalamazoo River, the area was backfilled immediately after excavation.

MDEQ directed Georgia-Pacific to re-excavate an area north of the Mill Lagoon 1 property boundary in 2008, as documented in the Source Investigation Report (ARCADIS June 2009; Appendix A). This additional area of re-excavation is included within the footprint of the excavation area around Former Mill Lagoons 1, 2, and 3 (Figure 11). Georgia-Pacific installed test pits to determine the extent of residuals, and then excavated the visible residuals. After excavating the visible residuals, the area was backfilled and no sampling was conducted by MDEQ. To confirm the removal of PCB-containing soils in this backfilled and vegetated area, ARCADIS collected three verification samples on November 13, 2008 (SS-01 through SS-03, Figure 11) in accordance with the *Georgia-Pacific LLC Kalamazoo Mill Property – Sampling Plan for Area Northwest of Former Mill Lagoon 1* (ARCADIS 2008). At each location, the verification soil samples were collected at 0- to 1-foot and 1- to 2-feet intervals using a 2-inch hand auger. Samples were submitted to KAR Laboratories for PCB analysis, and results indicated that all six of the samples were non-detect for PCBs (refer to Attachment 9 of the Source Investigation Report; Appendix A).

Field Screening in Mill Lagoon 3 Area

Five verification samples (1, 3, 10, TP, and DS) and one duplicate sample (10D) were collected (Figure 11) in November 1998, with a representative of MDEQ present to observe the verification sampling activities. Two additional samples (8 and 11) were also collected as requested by MDEQ. Samples were screened using the EnSys kit; three samples exceeded the screening level criterion of 9.2 mg/kg. Areas around these sample locations were re-excavated until all visible residuals were removed. Results are presented in Table 6-4.

Savannah Laboratories analyzed three samples. Specifically, TP and two locations along the south sidewall near the railroad tracks were analyzed, with results of 6.5, 38, and 12 mg/kg, respectively. The areas around the south sidewall sample locations were re-excavated removing all visible residuals. This activity was conducted prior to conducting the verification sampling described above. The areas that were re-excavated were part of the overall grid

pattern described by the calculation discussed in the above-referenced June 29, 1998 and May 25, 1999 letters to MDEQ (Appendix A), and the calculation provided in Appendix T.

The results of the verification sampling conducted in the area south of Mill Lagoon 3 were presented in a May 25, 1999 letter to MDEQ (Appendix A).

Mill Lagoon 4

Fourteen verification samples were collected in June 1999 (side wall and base of excavation samples shown on Figure 12). Analytical results for these samples were below the MDEQ-specified cleanup criterion of 9.9 mg/kg, with the exception of one sample (G52048) that had a PCB concentration of 12 mg/kg. The area around this sample was re-excavated, removing all visible residuals. In March and April 2009, verification samples (G52048A through G52048H) were collected around the approximate coordinates of G52048 (to a maximum depth of 4 feet), and all sample results were non-detect for PCBs (as shown on Figure 12). The arithmetic mean PCB concentration and 95% UCL following re-excavation were 0.82 and 2.1 mg/kg, respectively. A summary of the results and statistical analysis are provided in Table 6-5.

Mill Lagoon 5

Fifteen verification samples (G52080 through G52094) were collected in August 1999 (Figure 12). All samples were below the 9.9 mg/kg MDEQ-specified cleanup criterion, with the exception of one sample along the northern sidewall of the excavation that had a PCB concentration of 120 mg/kg (G52092). The area around this sample location was re-excavated, removing all visible residuals. In March and April 2009, verification samples (G52092A through G52092F) were collected around the approximate coordinates of G52092 (to a maximum depth of 3 feet), and all sample results were non-detect for PCBs (as shown on Figure 12). The arithmetic mean PCB concentration and 95% UCL following re-excavation were 0.35 and 0.59 mg/kg, respectively. A summary of the results and statistical analysis is provided in Table 6-6.

Nine additional verification samples (G52071 through G52079) were collected along the west sidewall in August 1999 at the request of MDEQ. Seven of the nine samples had PCB concentrations above the cleanup criterion of 9.9 mg/kg; PCB concentrations ranged from 1.9 to 170 mg/kg. As a result, the western end of the lagoon was excavated, extending the lagoon excavation length approximately 50 feet. Re-excavation of the lagoon removed all visible residuals. Four verification samples were collected along the new west sidewall in September 1999 (G52099 through G52102) (Figure 12), with results showing no detections above the MDEQ-specified cleanup criterion of 9.9 mg/kg. The results are summarized in Table 6-3.

On September 13, 1999 two test pits were excavated west of Mill Lagoon 5. Two samples were collected to further verify that the removal of residuals at Mill Lagoon 5 was complete; one

sample was collected from a test pit, and one sample from the west sidewall. PCBs were not detected in either sample. The laboratory results are included in Appendix N-5.

In accordance with the *Remedial Action Work Plan – Georgia-Pacific Mill Lagoons* (BBL June 1999; Appendix A), verification samples G52080 and G52085 (Figure 12) from Mill Lagoon 5 were analyzed for TCL/TAL constituents. The analytical results for TCL/TAL constituents by sample are summarized in Table 6-1.

6.7 Floodplain Area Post-Excavation Sampling and Analysis

Excavation of a portion of the floodplain area was carried out in accordance with the *Remedial Action Work Plan – Georgia-Pacific Mill Lagoons* (BBL June 1999; Appendix A) (Figure 11). This work, which was completed between July and September 1999, was considered an interim response action per the AOC (Appendix A). Approximately 5,000 cy of residuals were removed and consolidated into Cell 4 of the KHL OU. The excavation area extended to the edge of the river (approximately 753 feet AMSL) and down to the native soils. Upon completing excavation activities, the area was backfilled and vegetated, and a 5-foot-wide, 6-inch-thick layer of riprap was installed along the river. Visual cleanup criterion was used to determine the extent of excavation; however, MDEQ did conduct verification sampling to confirm that all of the established concentration targets had been met. Concentration targets (cleanup level) for the floodplain area adjacent to the five former mill lagoons was not established in Section II.G of the SOW; however, Section II.F of the SOW establishes a cleanup level for the five former mill lagoons at 9.9 mg/kg. MDEQ's laboratory analytical data are included in Appendix N-2. The result for MDEQ post-excavation sample ML-FP-13 in the floodplain area exhibited PCB concentrations greater than the MDEQ-specified cleanup criterion of 9.9 mg/kg (Table 6-7 and Figure 11). This location (ML FP-13) was re-excavated under MDEQ oversight in September 1999, removing approximately 20 cy of materials. The location was then re-sampled (G52098) for PCB, and the sample results were non-detect for PCBs (Table 6-3). BBL's laboratory analytical data are included in Appendix N-4.

6.8 Environmental Monitoring

Environmental monitoring was conducted throughout the RA activities at the Mill Lagoons and the floodplain area. The environmental monitoring activities included dust monitoring and high-volume air monitoring. Turbidity monitoring and water column sampling were conducted during the excavation of materials from the floodplain of the Mill Lagoons, as prescribed in the AOC (Appendix A). Each activity is discussed below.

6.8.1 Dust Monitoring

Dust monitoring was conducted daily by TECC and BBL during RA activities and consisted of both visual inspection of the site for airborne particles and monitoring via a Mini-Ram dust monitor. Dust monitoring was conducted at the locations shown on Figure 2. The action level for suspended particulates was $150 \mu\text{g}/\text{m}^3$ in compliance with the NAAQS. If the action level was attained, or visual inspection deemed it necessary, control measures were instituted in compliance with the *Remedial Action Work Plan – Georgia-Pacific Mill Lagoons* (BBL June 1999; Appendix A). Control measures included watering of source areas (e.g., roads, excavation faces), maintaining slower vehicular traffic on dirt roads, and/or terminating activities until the situation was corrected. Dust monitoring logs are included in Appendix O.

6.8.2 Air Monitoring

Air monitoring for PCBs was performed as prescribed in the *Remedial Action Work Plan – Georgia-Pacific Mill Lagoons* (BBL June 1999; Appendix A) during RA activities. Air monitoring was performed as described in a letter to MDEQ dated January 15, 1999 (Appendix A), and approved by MDEQ in a letter dated February 9, 1999 (Appendix A). High-volume air sampling was performed by BBL throughout the RA activities at the Mill Lagoons at the three locations shown on Figure 2. The PCB action levels were $0.2 \mu\text{g}/\text{m}^3$ for the north and southwest monitoring locations (G1 and H1, respectively) and $0.02 \mu\text{g}/\text{m}^3$ for the southeast monitoring location (H2) which is in closer proximity to King Highway.

The air monitoring program followed the procedures outlined by MDEQ in a December 11, 1998 facsimile (Appendix A). *USEPA Method TO-4 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air* (USEPA 1999) was the procedure followed for sample collection and analysis. Samples were collected during the entire workday during RA activities at the Mill Lagoons and the floodplain area except on those days when air monitors were not operational due to mechanical failure.

Three hundred and sixty air samples were collected and analyzed for PCBs by KAR Laboratories. Except for eight detections, all results were below detectable levels for the duration of the RA activities. When airborne PCBs were detected, MDEQ was notified within 24 hours (verbally, via phone), and corrective actions were taken. MDEQ was also forwarded laboratory analytical results on a weekly basis (or as soon as they became available) along with a cover letter summarizing the results. The following table lists the dates of the eight air

monitoring detections, the associated air sample concentration, and a summary of the corrective actions taken⁶.

Air Sample Collection Date	Air Sample Concentration ($\mu\text{g}/\text{m}^3$)	Corrective Action Taken
July 22, 1999	0.02	The contractor and MDEQ were verbally notified of the detection on July 29, 1999 (results were reported by the laboratory on that date) and engineering controls (i.e., placement of a 6- to 12-inch thick layer of sand over all of Cell 4 to reduce air emissions) were initiated. The data package and a description regarding the placement of the sand layer were sent to MDEQ on July 29, 1999 (Appendix A).
July 23, 1999	0.03	The contractor and MDEQ were verbally notified of the detection on July 29, 1999 (results were reported by the laboratory on that date) and engineering controls (i.e., placement of a 6- to 12-inch thick layer of sand over all of Cell 4 to reduce air emissions) were initiated. The data package and a description regarding the placement of the sand layer were sent to MDEQ on July 29, 1999 (Appendix A). Air samples collected on the following day (July 24, 1999) were all at concentrations below the detection level.
July 26, 1999	0.02	The contractor and MDEQ were verbally notified of the detection on July 28, 1999 (results were reported by the laboratory on that date), and the data package was sent to MDEQ on August 5, 1999 (Appendix A). This sample was collected prior to the completion of a sand layer over Cell 4 as a corrective action. Air samples collected on the following day (July 27, 1999) were all at concentrations below the detection level.
August 30, 1999	0.03	The contractor and MDEQ were verbally notified of the detection on September 3, 1999 (results were reported by the laboratory on that date) and engineering controls (i.e., dust suppression in Cell 4) were initiated. The data package was sent to MDEQ on September 8, 1999 (Appendix A). Air samples collected on the following day (August 31, 1999) were all at concentrations below the detection level.
September 15, 1999	0.02	The contractor and MDEQ were verbally notified of the detection on September 23, 1999 (results were reported by the laboratory on that date), and the data package was sent to MDEQ on September 30, 1999 (Appendix A). Air samples collected on the following day (September 16, 1999) were all at concentrations below the detection level.

⁶The air monitoring detections from August 30, 1999 and September 15, 17, 24, and 28, 1999 listed in the table below are also the air monitoring detections listed in the table included in Section 5.7.2.

Air Sample Collection Date	Air Sample Concentration ($\mu\text{g}/\text{m}^3$)	Corrective Action Taken
September 17, 1999	0.02	The contractor and MDEQ were verbally notified of the detection on October 1, 1999 (results were reported by the laboratory on that date), and the data package was sent to MDEQ on October 4, 1999 (Appendix A). Air samples collected on the following day (September 18, 1999) were all at concentrations below the detection level.
September 24, 1999	0.02	The contractor and MDEQ were verbally notified of the detection on October 1, 1999 (results were reported by the laboratory on that date), and the data package was sent to MDEQ on October 5, 1999 (Appendix A). Air samples collected on the following day (September 25, 1999) were all at concentrations below the detection level.
September 28, 1999	0.03	The contractor and MDEQ were notified of the detection on October 5, 1999 (sample results were reported on October 4, 1999), and as a corrective action, the site was watered down to aid in dust control (as documented in an October 8, 1999 letter to MDEQ). The data package was sent to MDEQ on October 8, 1999 (Appendix A). Air samples collected on the following day (September 29, 1999) were all at concentrations below the detection level.

RA activities at the Mill Lagoons and floodplain area were performed concurrent with other RA activities associated with the KHL OU. These detections may not have been caused by activities associated with the removal of residuals from the Mill Lagoons or floodplains. The results from all the air monitoring activities – including samples taken during other components of the RA at the KHL OU and the Mill Lagoons – are included in Table 4-3 and in Appendix P. Meteorological data associated with air quality are found in Appendix Q.

6.8.3 Turbidity Monitoring and Water-Column Sampling

Turbidity monitoring and water-column sampling were conducted as specified in the *Remedial Action Turbidity Monitoring Plan* (BBL July 1999; Appendix A) during the RA activities at the floodplain area. Monitoring was conducted to assess the impacts of the excavation activities, if any, on surface water quality, and to provide a means to evaluate the effectiveness of erosion control measures. As prescribed in the *Remedial Action Turbidity Monitoring Plan* (BBL July 1999; Appendix A), the measurements of turbidity were made in the Kalamazoo River approximately 100 feet upstream and 100 feet downstream of the work area. Turbidity measurements were collected daily 2 hours into each shift at mid-river depth. One water-column sample was collected from each of the turbidity monitoring locations once per day at the same time that the turbidity monitoring measurements were collected. An action level criterion of 25% variance between the upstream and downstream locations was applied.

Turbidity monitoring and water-column sampling were conducted only on days when excavation activities were performed adjacent to the Kalamazoo River. Turbidity monitoring yielded six upstream and six downstream measurements. All results were below the action level for the duration of the RA activities. The monitoring results are summarized in Table 6-8.

Twelve water-column samples were collected and analyzed for PCBs by KAR Laboratories; all results were below the MDEQ Target Detection Limit of 0.2 µg/L. The laboratory analytical results are included in Appendix R-3.

6.9 Site Restoration

Following removal of the residuals and analysis of verification sampling, the Mill Lagoon excavation areas were backfilled using an imported clean material, then covered with a minimum of 6 inches of topsoil, graded to the contours shown on Figure 13, and hydroseeded. Mill Lagoons 1, 2, and 3 were backfilled, covered with topsoil, and hydroseeded in August 1999. Mill Lagoon 4 was backfilled in June 1999 and covered with topsoil and hydroseeded in August 1999. Mill Lagoon 5 was backfilled, covered with topsoil, graded as shown on Figure 14, and hydroseeded in November 1999. Floodplain areas were also backfilled using an imported clean material in August 1999, then covered with topsoil and hydroseeded in November 1999. Approximately 400 linear feet of riprap, 5 feet wide and 9 inches thick, placed on top of a geotextile was installed along the Kalamazoo River to protect the regraded soils from river-induced erosive forces (Figure 13).

7. Removal Activities at Other Areas

Visible PCB-containing residuals were removed from several areas at the KHL, in addition to those described in the previous sections. As referred to in a letter to MDEQ (September 18, 1998; Appendix A), during construction activities, residuals were observed in three areas: an area at the southeast corner of the KHL, an area south of Cell 3, and a location north of Cell 4 (Figure 15).

Visible residuals were later discovered in the area beneath and adjacent to the sedimentation basin, an area along the southwest side of KHL, and in the southwest portion of the MDOT R-O-W south of the site security fence (Figure 15).

7.1 Sedimentation Basin Area Excavation

During clearing and grubbing activities in December 1998, residuals were found covering most of the sedimentation basin area. Four test pits were completed, ranging in depth from approximately 3 to 6 feet below the existing ground surface to verify the extent of the residuals. Prior to the removal of visible residuals, four samples from the test pits were collected by a representative of BBL and field-screened for the presence of PCBs greater than 10 mg/kg using EnSys kits. All four samples tested positive for PCBs greater than 10 mg/kg. These activities are discussed further in a January 29, 1999 letter from RMT to BBL transmitted to MDEQ on February 2, 1999 (Appendix A).

Visible PCB-containing materials from within and adjacent to the sedimentation basin were removed to within 1 foot of the water table, transported to Cell 4, and consolidated. Existing materials below the water table were left in-place. Approximately 12 feet of general fill was used to backfill and shape the sedimentation basin above the groundwater table to the specified elevations on Figure 4.

7.2 Area Southwest of KHL

Soil sampling activities were conducted from April 5 through April 7, 1999 to evaluate the horizontal and vertical extent of residuals along the southwestern boundary of the KHL. Fifteen soil borings were advanced along the western boundary of the KHL (KHL-SB-1 through KHL-SB-15). From the stratigraphy observed on the soil boring logs, broad layers (varying from 1 to 22 feet in thickness) of residuals were observed in soil borings KHL-SB-2, KHL-SB-3, KHL-SB-6, KHL-SB-7, and KHL-SB-9 through KHL-SB-12. Whereas, the stratigraphy observed on the soil borings logs for KHL-SB-5, KHL-SB-8, KHL-SB-13, and KHL-SB-14 indicated that residuals were observed in trace to little/intermittent amounts.

Ten soil samples were collected from soil borings KHL-SB-2, KHL-SB-5, KHL-SB-8, and KHL-SB-10 through KHL-SB-15 and analyzed for PCBs. The analytical results of the samples indicated PCB concentrations ranging from non-detect to 18 mg/kg. The residuals encountered in soil borings KHL-SB-2 through KHL-SB-12 were consolidated in the landfill.

A total of approximately 3,000 cy of material was excavated during these aforementioned removal activities. The analytical results of the samples collected from soil borings KHL-SB-13, KHL-SB-14, and KHL-SB-15 were 2.3 mg/kg, 0.35 mg/kg, and non-detect, respectively, which are below the residential cleanup criterion of 4 mg/kg (MDEQ Part 201 Residential Commercial I Direct Contact Cleanup Criterion).

A more detailed account of the work, including soil borings and laboratory analytical data, are as presented in a July 26, 1999 letter to MDEQ (Appendix A).

7.3 Other Areas

Visible PCB-containing materials were also discovered in the southeast corner of the KHL, a small area north of Cell 4, and an area south of Cell 3 (Figure 15), as referred to in a letter to MDEQ (September 18, 1998; Appendix A). These areas of visible residuals were located at shallow depths and within small areas.

During a September 15, 1998 site visit to the KHL, an investigation was completed in two of the three areas of residuals discovered during construction activities conducted on the south side of the landfill just prior to the September visit. MDEQ was present during the site visit. The contractor onsite during the meeting believed that the residuals in these areas were present in very small amounts. During the site visit, it was agreed that the residuals from these two areas would be removed during subsequent construction activities associated with the RA and placed into the interior of the capped portion of Cell 4.

The third area of residuals was located between the river and the landfill where the corners of Cells 2, 3, and 4 meet on the floodplain (north of Cell 4). During the September 15, 1998 site visit with MDEQ, two pits were excavated in this area. Visual observations of the stratigraphy in the two pits revealed that the residuals did not extend vertically more than two to three inches. It was agreed that these residuals would also be excavated and placed into Cell 4. Following the onsite meeting, these areas of visible residuals were promptly removed and consolidated into Cell 4.

In addition to the areas identified above, residuals were observed in the MDOT R-O-W during installation of landfill gas cutoff trenches in 2008. Following observation of the residuals, visual observation and analytical testing via the advancement of soil borings and the excavation of test pits was conducted to delineate the extent of PCB-containing material. During the

delineation activities, approximately 3,000 cy of material was excavated and transported offsite for disposal at an appropriately permitted landfill. Following these removal activities, an approximately ¼-acre area of PCB-containing soils/residuals remained. This area was delineated and surveyed, and is referred to as Parcel C. The top one foot of material in Parcel C was excavated and an orange non-woven geotextile (demarcation layer) was placed at the bottom of the excavation. The area was then backfilled with a one-foot-thick layer of clean backfill material, graded, seeded, and mulched to promote drainage and facilitate revegetation. Additional detail regarding the removal activities within the MDOT R-O-W is provided in Section 11.3.

8. KHL Final Cover System

The Type III final cover system for KHL Cells 1, 2, 3, and 4 was designed in accordance with the Michigan NREPA, 1994 Public Act, as amended (Act 451), Part 115 (Part 115). According to the AOC (Appendix A), the objectives for the final cover system are to:

- Restrict the potential for PCB migration from leachate to groundwater.
- Restrict the potential for contact with PCB-containing soil/residuals by workers and trespassers.
- Restrict the potential transport of PCB-containing soil/residuals along the dike to the river in surface runoff or by erosion of soil/residuals due to river flows.

The installation of the final cover included the following components; as discussed in this section

- Cells 1, 2, 3, and 4 dike stabilization
- Cell 4 bottom stabilization
- Subgrade preparation
- Installation of 6-inch-thick gas-venting layer
- Installation of 40-mil LLDPE FML
- Installation of 24-inch-thick drainage/barrier protection layer
- Installation of 6-inch-thick vegetative layer

8.1 Dike Stability

The perimeter dike is located between the KHL and the Kalamazoo River and extends approximately 500 feet along the eastern side of Cell 4 and approximately 1,450 feet along the northern side of Cells 1, 2, 3, and 4. Approximately 1,000 feet of steel sheetpiling was installed at various times to stabilize the perimeter berm along the northern side of Cells 1, 2, and 3 of the KHL (Figure 4). In 1994, sheetpiling (type 2NRD3 supplied by Frodingham) was installed along a 115-foot length of the berm at the toe of the slope to stabilize the slope and to provide erosion control protection. In addition, 866 feet of sheetpiling (type Z75 supplied by Canadian Metal Rolling Mills) was installed between October and December 1996. The sheetpiling was extended to encompass the northern boundary of the landfill with the Kalamazoo River. The sheetpiling extends from the northwest corner of the landfill, 1,000 feet to the east (Figure 4). The 1996 construction activities associated with the installation of the sheetpiling are detailed in *Erosion Control System Construction Documentation* (RMT March 1997; Appendix A).

Lowering the crest elevation and reducing the side-slope angles in 1998 stabilized the perimeter dike along Cell 4. The dike was regraded from a configuration of approximately 1 horizontal to 1 vertical (1H:1V) to an approximate 4H:1V. Waste materials generated during dike excavation and regrading activities, as well as chipped vegetation from the work area, were placed in Cell 4.

Temporary erosion control measures consistent with the ESCP (BBL 2002a) included installation of a silt fence, a silt curtain, and mulch blankets placed on and around the side slopes of the dike during stabilization activities. Silt fencing was installed at the toe of the dike side slopes to reduce the velocity of storm water runoff and to collect sediment contained in storm water runoff. A silt curtain was installed along the Kalamazoo River adjacent to the riverbank along the northern and eastern portions of Cell 4 to prevent sediment-carrying storm water runoff from being transported down the river.

Permanent erosion control measures consistent with the ESCP (BBL 2002a) included the installation of riprap at selected locations along the toe of the regraded dike where river water velocities could cause erosional losses or bank cutting. Riprap was placed approximately 650 feet along the eastern side of Cell 4, and approximately 450 feet along the northern side of Cell 4. The riprap extended vertically approximately 25 feet up the side slope of the regraded dike (Figure 4). In addition to the riprap revetment, grass was planted on the dike side slopes to minimize erosion.

8.2 Cell 4 Bottom Stabilization

Before the start of response activities in Cell 4, ponded water was removed to prepare for the stabilization of the residuals at the cell bottom. The removed water was treated at the temporary water treatment system before being discharged to the Kalamazoo River in conformance with the SRD (MDEQ July 1998; Appendix H). Approximately 1.4 million gallons of water from Cell 4 were treated in 1998 and 1999.

During and after the removal of ponded water from Cell 4, residuals at the bottom of the cell were stabilized. Stabilization measures included using imported soils and woodchips (as directed by USEPA in a May 29, 1998 meeting; Appendix A) in combination with a geogrid, followed by layers of imported, clean, permeable sand. The woodchips were used at the southern corner of Cell 4. The bottom of Cell 4 was stabilized to provide a suitable working surface for subsequent placement of the consolidated residuals.

8.3 Backfill Placement and Subgrade Preparation

Before the installation of the final cover system, portions of the KHL needed to be filled to subgrade design grades. Materials from the excavation activities at the KHL OU, Mill Lagoons,

the Kalamazoo River, and one of the off-site King Mill Lagoons were used as fill material. Imported, permeable, clean fill was interspersed with the excavated materials in alternating lifts. The permeable fill layers were used as a final measure of dewatering and to promote waste consolidation (i.e., the layers helped to further drain the residuals). Materials were placed in Cells 3 and 4 in approximately 1-foot-thick lifts (as specified in Section 4.3.5 of the EDR [BBL June 2002; Appendix A]), and compacted with a minimum of five passes of a drum roller.

Cells 1 through 4 were graded to the final top of waste grades as shown on Figure 16. Upon completion of final grading, the subgrade was compacted with a drum roller, and foreign materials on the surface of the subgrade were removed to prevent intrusion into the gas-venting layer and puncture, damage, or abrade the geomembrane. No objects greater than 12 inches in greatest dimension were incorporated into the Cell 4 fill. No objects greater than 6 inches in greatest dimension were placed within 1 foot of the bottom of the gas-venting layer. Figures 17 through 23, taken from the MDEQ-approved HMP (BBL 2002c), illustrate the cross-sections through the graded landfill.

8.4 Gas-Venting System

A passive gas venting system comprising a venting soil layer and gas risers was installed as part of the cover system to control and vent migrating gases. Monitoring for lateral gas migration in the subsurface is performed at the perimeter of the KHL OU in accordance with the LGMP. The landfill gas monitoring data collected to date is summarized on Table 8-1, and monitoring locations and associated data are presented on Figure 24. Project correspondence related to the quarterly gas monitoring events is included in Appendix A.

8.4.1 Gas-Venting Layer Installation

Approximately 20,800 cy of gas-venting layer material, composed of imported, permeable, clean soil, was placed at the KHL as indicated in Table 8-2. The layer was placed in an average 7-inch-thick lift (Table 8-3) using low-ground-pressure equipment. Installation was conducted in a manner that minimized the mixing of the underlying material. The soil material collects and transmits landfill gases to the gas vents.

8.4.2 Gas Vents

Twenty-three passive gas riser vents were placed within the gas-venting layer at the KHL (Figure 4). The vents were designed with 4-inch-diameter PVC riser pipes extending into the gas-venting layer and residuals. Each pipe extends approximately 4 feet above the final grade and currently has a wind turbine ventilator.

8.4.3 Gas Monitoring Probes

Perimeter gas monitoring probes located outside the limits of waste were installed as part of the LGMP in April 2002. Four gas monitoring probes (GW-1 through GW-4) were installed at the locations shown on Figure 4. The probes consist of a two-inch diameter slotted PVC pipe surrounded with pea gravel (see Appendix U for the Gas Well Construction Details). The depths of the gas monitoring probes are at least to the bottom of the residuals in the adjacent OU.

8.5 Flexible Membrane Liner

Upon final inspection of the gas-venting layer, a 40-mil LLDPE geomembrane was installed by GSI on the prepared surface to minimize migration of precipitation into the landfill. The geomembrane was installed between October 20 and December 15, 1999 covering a total of 722,480 square feet (Table 8-4). The panels were seamed together using either a dual hot-wedge welder or an extrusion welder. Penetrations in the geomembrane (e.g., gas vents) were encased with smooth geomembrane "boots" to minimize water infiltration and disturbance caused by settlement. QA/QC testing was conducted on all geomembrane seams and selected geomembrane panels in accordance with the CQAP (BBL 2002b) (discussed further in Section 9.3). Any area that failed the nondestructive QA/QC test was repaired by using either a dual hot wedge welder or an extrusion welder to attach a new piece of geomembrane over the affected area.

8.6 Drainage/Barrier Protection Layer

Upon completion of the geomembrane installation, approximately 63,600 cy of barrier protection soil (imported, permeable, clean soil) was placed over the geomembrane as indicated in Table 8-5. The layer was installed at an actual average thickness of 25 inches (Table 8-6). As a measure to prevent damage to the underlying LLDPE geomembrane, low ground pressure equipment was used during drainage/barrier protection layer installation. In addition, during activities during which there was a potential for impacting the underlying liner material (e.g., during use of the rubber-tired construction equipment to transport sand over the liner) a minimum 4-foot drainage layer was in place as a roadway (see February 5, 2002 letter from TECC in Appendix A). Placement of the barrier protection soil layer provides drainage, protects the underlying geomembrane, and promotes the establishment of vegetation on the landfill. The barrier protection soil layer consists of soil containing no objects larger than 4.75 millimeters in greatest dimension and is free of potentially deleterious materials such as refuse, roots, or stumps.

8.7 Vegetative Layer

Approximately 21,600 cy of vegetative layer was placed above the barrier protection layer and along the dike side slopes as indicated in Table 8-7. The layer was placed in an actual average layer thickness of 6.2 inches (Table 8-8). As referenced in a February 5, 2002 letter from Terra Contracting, mulch delivered to the site was distributed at a rate of 1.8 tons per acre (Appendix A). Placement of the vegetation layer is intended to promote vegetative growth over the landfill, prevent erosion, increase evapotranspiration of precipitation, and enhance the appearance of the landfill. The layer was installed between May 21 and June 7, 2000 because traffic was minimal. Minimizing traffic on the vegetative layer avoids compaction and promotes proper aeration.

The vegetative soil layer, with an organic content sufficient to support a strong stand of vegetation, was free from refuse, material toxic to plant growth, woody vegetation, stumps, roots, brush, clods of clay, stones, and other large objects. The specified mixture of grass seed was applied over the surface as significant areas of the cover system were completed. The NERC custom seed mixture consisted of a proprietary blend of 50% Tall Fescue, 20% Creeping Red Fescue, 10% Kentucky Bluegrass, 10% Perennial Ryegrass, and 10% Annual Ryegrass, by weight and was planted at a rate of 150 pounds per acre (refer to the approved NERC seed mixture modification submittal contained in Appendix V). In addition, crown vetch was planted on the steep berm slopes as indicated on Figure 6.

9. Quality Assurance/Quality Control of Final Cover System Installation

This section presents a summary of the results of QA/QC testing and observations performed during the final cover installation at the KHL. QA/QC testing was performed on the gas-venting layer, geomembrane, barrier protection layer, and the vegetation layer in accordance with the EDR (BBL June 2002; Appendix A) and CQAP (BBL 2002b). Table 9-1 lists the required testing and testing frequency.

9.1 Preconstruction Soil Testing

Backfill and topsoil materials were analyzed for the chemical constituents identified in the letter proposal to MDEQ dated October 7, 1998 (Appendix A). Two composite samples were tested for PCBs, volatile organic compounds (VOCs), phenol, 4-methylphenol, and metals, including arsenic, barium, chromium, lead, thallium, vanadium, and zinc. Sample results for the topsoil and backfill materials are included in Submittals 5A and 8, respectively (see Appendix W).

Prior to construction of the gas-venting layer and the barrier protection layer, five samples were collected by BBL and tested by PSI to determine the particle size and permeability, as specified in the CQAP (BBL 2002b). PSI conducted a total of five sieve analyses (ASTM C-117 and C-137) and one permeability test (constant head) (ASTM D-2434). Results of the particle-size analyses indicated on average 97% passed the No. 4 sieve and on average 0.9% by weight passed the No. 200 sieve. Results of permeability tests indicated an average permeability of 1.13×10^{-3} cm/sec. The laboratory results are included in Appendix X. It should be noted that the CQAP (BBL 2002b) required that 100% passed the No. 4 sieve; however, this was modified to require that 95-100% passed the No. 4 sieve. Documentation for this modification and its approval is provided in Appendix Y. Testing parameters, frequency, and results are summarized in Table 9-1.

9.2 Gas-Venting Layer

The QA/QC testing associated with the placement of the gas-venting layer included particle-size, permeability, and depth-verification testing. The results of particle-size and permeability tests are presented in Table 9-1 and are included in Appendix Z; the results of depth-verification testing are summarized in Table 9-1 and presented in Table 8-2.

Samples of the in-place gas-venting layer were collected by BBL and tested by PSI to determine the particle size and permeability as specified in the CQAP (BBL 2002b). PSI conducted a total of 20 sieve analyses and four permeability tests on the gas-venting layer soil. Results of the particle-size analyses, conducted at a frequency of one per 720 cy installed, indicated on average 97% passed the No. 4 sieve and an average 1.2% by weight passed the

No. 200 sieve. Results of permeability tests, conducted at a frequency of 1 per 3,780 cy installed, indicated an average permeability of 1.34×10^{-3} cm/sec (Table 9-2).

The gas-venting layer thickness was field-verified by BBL using hand excavation to document that a minimum thickness of 6 inches was attained throughout the soil layer as specified in the CQAP (BBL 2002b). The tests were conducted at a frequency of approximately 7.8 tests per acre at random locations over the KHL. Areas containing less than 6 inches of soil were filled with additional soil and were then retested. A total of 125 tests were conducted with results showing an average layer thickness of 6.9 inches. Locations and results of the verification testing are presented on Figure 25 and Table 8-2, respectively. The contractor was notified of any deviations, either above or below the required thickness. Once the area was regraded, material was added or removed, as necessary, the area was rechecked for thickness.

9.3 Geomembrane

Requirements associated with the installation of geomembrane included the submittal of QA/QC manuals, subgrade acceptance forms, manufacturing testing of the geomembrane, destructive and nondestructive testing of geomembrane seams, pre-weld start-up tests, and daily progress reports. This information is presented in the Appendix AA series (AA-1 through AA-14).

Random samples of the geomembrane sheet material were tested by GSE prior to delivery. The manufacturer's test results are included in the Appendix AA series. Testing was done in accordance with the CQAP (BBL 2002b), with the exception of environmental stress crack resistance testing results. Environmental stress crack resistance testing results are only available for two of the six lots of geomembrane liner used for the final cover system, as the testing results for the remaining lots were not obtained from the manufacturer during the time of construction. In December 2011 and January 2012, efforts were made to locate the environmental stress crack resistance testing results for the remaining lots of geomembrane liner (as documented in Appendix GG); however, the testing results could not be located.

Upon receipt of the rolls of the geomembrane, random samples were obtained by BBL and sent to TRI for conformance testing in accordance with the CQAP (BBL 2002b). The test results indicated that the geomembrane was acceptable as specified in the project specifications. Laboratory test results are included in Appendix BB.

Nondestructive tests were conducted on 100 percent of the seams as specified in the CQAP (BBL 2002b) on geomembrane seams by means of an air test or a vacuum box test. Air tests were conducted on seams installed using a dual hot-wedge welder; the results are included in Appendix AA-8. The vacuum box tests were conducted on seams that could not be air-tested; this included seams that were installed using the extrusion welder. Each location that failed

nondestructive testing was repaired and retested as described in Section 8.5. The nondestructive test results are included in Appendix AA-8.

Destructive tests were conducted on geomembrane seams at a minimum frequency of one test per 455 linear feet of field seam, as specified in the CQAP (BBL 2002b). Samples of these seams were collected by GSI and BBL and were QC-tested by GSI in its onsite laboratory and sent to TRI for QA testing. A total of 73 destructive tests were conducted at the locations shown in Appendix AA-2. All results were above the minimum acceptance values specified in the project specifications. The destructive test results from GSI's onsite laboratory and from TRI are summarized in Table 9-1 and included in Appendices AA-12 and CC, respectively.

At the start and midpoint of each workday of geomembrane installation and after each change in equipment, pre-weld start-up tests were conducted as specified in the CQAP (BBL 2002b) on welded test strips using both the dual hot-wedge welder and the extrusion welder. These samples were prepared by GSI and were tested at GSI's onsite laboratory under BBL observation. The pre-weld start-up test results are included in Appendix AA-11.

At the completion of each workday of geomembrane installation, GSI prepared a geomembrane daily report that summarized all of the geomembrane panels installed and seamed on that day. Copies of the geomembrane reports are included in Appendix AA-7. The GSI certification letter for the geomembrane installation is included in Appendix DD. The geomembrane reports were completed in accordance with the CQAP (BBL 2002b), with the exception of documentation of geomembrane panel placement. The GSI geomembrane panel placement forms were partially completed to indicate the roll numbers used for 68 of the 165 panels placed during construction of the final cover system. In December 2011 and January 2012, efforts were made to locate completed GSI geomembrane panel placement forms (as documented in Appendix GG); however, completed forms could not be located.

All areas of the geomembrane were examined by BBL for identification of defects, holes, blisters, etc. Each suspect location was nondestructively tested, and any location that failed the nondestructive testing was marked by BBL, repaired by GSI as specified in the CQAP (BBL 2002b), and retested. The nondestructive testing of repairs was observed by BBL. Repairs that passed the nondestructive tests were deemed adequate; areas that failed testing were redone and retested until they passed the nondestructive tests. Locations of seams that failed the nondestructive tests that were repaired are shown on the final geomembrane layout for the KHL. This figure is presented in Appendix AA-2.

9.4 Drainage/Barrier Protection Soil Layer

The QA/QC testing associated with the placement of the barrier protection soil layer included particle-size and depth-verification testing. The results of the particle-size testing are

summarized in Table 9-1 and included in Appendix EE; the depth-verification testing results are presented in Table 8-6.

Samples of the in-place barrier protection soil layer were collected by BBL and tested by PSI as specified in the CQAP (BBL 2002b) to determine the barrier protection layer particle size. A total of 14 sieve analyses (ASTM C-117 and C-137) were conducted on the barrier protection layer. Particle-size analyses, conducted at a frequency of approximately one test per 4,500 cy installed, had an average 97% passing the No. 4 sieve and an average 1.8% passing the No. 200 sieve. The CQAP (BBL 2002b) indicated that particle-size analyses would be conducted at a frequency of 1 per 1,000 cy during construction for both the gas-venting layer and the barrier protection layer. However, this was not the original intent, as the 1 per 1,000 cy frequency was intended to apply only to the gas-venting layer, which had more stringent particle-size requirements than the barrier protection layer (95-100% passing the No. 4 sieve and less than 5% by weight passing the No. 200 sieve). As discussed in Section 9.2 above, particle-size analyses for the gas-venting layer were conducted at a frequency of one per 720 cy installed, which was greater than the specified frequency of 1 per 1,000 cy installed. Per Section 4.4.1.4 of the CQAP (BBL 2002b), particle-size analyses for the barrier protection layer were required to confirm that 95-100% of the materials passed the No. 4 sieve (as stated above, test results indicated an average 97% passing the No. 4 sieve as well as an average 1.8% passing the No. 200 sieve). In addition to the particle-size analyses conducted by PSI during construction, visual analyses of the barrier protection layer were performed by the CQA Observer(s) during construction to identify any particles greater than 4.75 millimeters in greatest dimension (No. 4 sieve). Additionally, particle-size analyses were conducted on the barrier protection material source prior to use. Based on the passing test results of the particle-size analyses conducted by PSI during construction, in combination with visual analyses conducted by the CQA Observer(s) and the passing results of pre-construction testing of the barrier protection layer material, it can be reasonably ascertained that the required material characteristics of the barrier protection layer were met.

The barrier protection soil layer thickness was field-verified by BBL using hand excavation to document a minimum thickness of 24 inches throughout the soil layer, as specified in the CQAP (BBL 2002b). The tests were conducted at a frequency of approximately 3.2 tests per acre at random locations over the KHL. Areas containing less than 24 inches of soil were filled with additional soil and then retested. A total of 51 tests were conducted; the actual average layer thickness was 25 inches (Table 8-6). Locations and thickness of the verification testing are presented on Figure 26 and Table 8-6, respectively. The contractor was notified of any deviations, either above or below the required thickness. Once the area was regraded, material was added or removed, as necessary; the area was rechecked for thickness.

9.5 Vegetation Layer

The vegetation layer thickness at the KHL was field-verified by BBL using hand excavation to document a minimum thickness of 6 inches throughout the vegetation layer, as specified in the CQAP (BBL 2002b). The tests were conducted at random locations and in areas suspected of being less than 6 inches thick at a frequency of approximately 3 tests per acre. Areas containing less than 6 inches of vegetated soil were filled with additional soil and retested. A total of 49 tests were conducted with an actual average layer thickness of 6.2 inches (Table 8-8). Locations and thickness of the verification testing are presented on Figure 27 and Table 8-8, respectively. The contractor was notified of any deviations, either above or below the required thickness. Once the area was regraded, material was added or removed, as necessary; the area was rechecked for thickness.

10. Storm Water Management System

As part of the KHL OU closure, a storm water management system was installed to facilitate the control of storm water runoff while minimizing soil erosion. Storm water control, consistent with the EDR (BBL June 2002; Appendix A), was implemented at the start of the RA activities and included both temporary and permanent storm water controls, construction of a sedimentation basin, and installation of a pore water collection system. The storm water controls were maintained throughout the RA activities and will be maintained during the post-closure period. Both the temporary and permanent storm water controls are described below.

10.1 Temporary Storm Water Controls

Temporary storm water runoff controls were used during the construction phase and for a short time thereafter. The controls were used to: minimize erosion and sediment loading to the Kalamazoo River; prevent sediment from being carried beyond the limit of disturbance due to RA activities; reduce storm water runoff velocity; and reduce the potential for erosion of recently placed subgrade materials and cover system layers. Temporary controls (i.e., silt fencing, silt curtains, and erosion control blankets) were installed at the perimeter of the disturbed areas, along or in the Kalamazoo River, and in regraded drainage ditches. Temporary sediment control devices were employed until a permanent, strong vegetative stand was established and the temporary devices were no longer required.

10.2 Permanent Storm Water Controls

Following the installation of the KHL cover system and site restoration at the areas disturbed due to RA activities, permanent storm water controls were installed to convey storm water to the Kalamazoo River in a controlled fashion. Permanent storm water controls were implemented to reduce the potential for erosion of vegetated and protected slopes. Storm water controls consisted of sedimentation basin, diversion berms, riprap, and vegetation.

Diversion berms, constructed on the KHL cover system in May 2000 and shown on Figure 4, were placed to reduce runoff velocities, convey 63% of the storm water runoff to the sedimentation basin and 37% to the Kalamazoo River, and accommodate concentrated flow with minimal erosion. The diversion berms were vegetated with native grasses.

Riprap aprons were constructed at the southeast and southwest corners of the KHL, and also at the eastern edge of the sheetpiling north of the KHL (Figure 4). The aprons were constructed of riprap to minimize erosion of the underlying soils. These aprons convey storm water runoff to the Kalamazoo River.

On the stabilized dike at Cell 4, a mixture of vegetation and riprap protection on the side slopes was employed to control storm water runoff and to protect the riverbank during high-flow events. The permanent vegetative erosion control measures on the side slopes included grass, while the permanent structural erosion control measure included a riprap revetment along the lower portions of the side slope.

At the KHL OU and the Mill Lagoons, vegetated, gently sloped surfaces, typically 4% or less, were constructed to control storm water runoff. Native field grasses were planted on the cover system at the Mill Lagoons and the KSSS to control erosion. Additionally, crown vetch and erosion control matting was planted on the steep side slopes of the KHL (Figure 6).

10.3 Pore Water Collection System

A pore water collection system was installed at the KHL as shown on Figure 4, at the toe of the final cover system. The system promotes drainage from the soils in the final cover system to maintain the stability of the soil cover over the geomembrane by collecting and conveying water to outlets (Figure 4). There have been certain modifications made to the pore water collection system over time; however, its current and final configuration is shown on Figure 4. As shown on Figure 4, pore water from the southern portion of the KHL discharges through a riprap spillway into a settling basin in the southwest portion of the property, while pore water from the northern portion of the KHL discharges directly to the Kalamazoo River (Figure 4).

10.4 Sedimentation Basin

A sedimentation basin was constructed on the southwest portion of the KHL (Figure 4). The sedimentation basin was built to detain storm water runoff, reduce the flow velocity, and allow particulates to settle out of suspension prior to discharge of the storm water to the Kalamazoo River. The basin is designed to collect approximately 63% of the total storm water runoff from the cover system surface of Cells 1, 2, and 3, and to reduce sediment loading. The additional runoff is discharged to the Kalamazoo River via sheet flow off Cell 4 and via riprap aprons. Shortly after its construction, it was observed that the final survey elevations of the sedimentation basin were not consistent with design elevations. As a result, in November 2003 Georgia-Pacific performed maintenance at the sedimentation basin to restore it to the specified design grades. The restored basin was then surveyed in February 2004 and verified to be consistent with the specified design grades, as presented in Appendix F.

11. Construction Activities Completed Since 2006

After reviewing the version of the Completion Report submitted to MDEQ in May 2004 (BBL May 2004; Appendix A), MDEQ notified Georgia-Pacific that certain elements of the remedy had been constructed on land owned by other parties, including within the MDOT R-O-W. In addition, landfill gas monitoring results revealed that methane gas was migrating offsite at concentrations above the lower explosive limit (LEL). These issues were documented in MDEQ's *Formal Disapproval of the Draft Final Report for Completion of Construction*, issued on June 27, 2006 (Appendix A). While investigating these issues, additional residuals were discovered beyond the extent of the landfill in the MDOT R-O-W. Resolution of the property ownership, methane migration, and the presence of residuals outside the capped area of the landfill issues are described in Sections 11.1, 11.2, and 11.3, respectively. As part of this process, there were extensive construction- and administrative-related proceedings, including those related to modifications to the AOC⁷. For ease of review, a chronological summary of key communications, construction activities, meetings, and other pertinent milestones is provided in Table 11-1, and a complete collection of project correspondence since 2004 is provided in Appendix A.

In addition, although USEPA completed its initial Five-Year Review of the KHL OU in October 2007 and determined that the completed elements of the remedy were functioning effectively, as described in the *Five-Year Review Report* (USEPA October 2007; Appendix A), USEPA acknowledged that additional steps were necessary to control methane gas, and agreed with the need to address identified institutional control issues in the MDOT R-O-W. At the time the 5-year review was completed, it was not known that residuals contiguous with the landfill that extended onto adjacent properties remained.

11.1 Addressing the Property Ownership Issue

After construction of the remedy, it was identified that Georgia-Pacific did not own all the property within the security fence installed along the southern border of the KHL, where certain components of the remedy were located (see R-O-W boundary on Figure 4). At the time the May 2004 Completion Report was disapproved, this area included three separate parcels:

- Parcel A, owned in fee by MDOT
- Parcel B, owned in fee by the City of Kalamazoo (with MDOT having easement rights)

⁷ As part of the resolution, Georgia-Pacific, MDEQ, and MDAG agreed upon a modified schedule for completing the response activities under the AOC (Modified AOC Schedule). The Modified AOC Schedule was originally agreed upon in January 2008 and was subsequently revised (in agreement with MDEQ and MDAG) in concert with the evolution of the scope of the response activities. The most recent Modified AOC Schedule was agreed upon in September 2011 (refer to September 9, 2011 letter included in Appendix A).

- The Triangle Parcel, owned in fee by MDOT

These parcels are shown on Figure 3. To address this issue, Georgia-Pacific purchased the Triangle Parcel from MDOT in early 2006, and completed the acquisition of Parcels A and B from MDOT and the City of Kalamazoo, respectively, in June 2008. Those purchases and the earlier acquisition of the Triangle Parcel satisfactorily addressed the property ownership issue identified in MDEQ's June 27, 2006 (Appendix A) letter.

11.2 Addressing the Migration of Methane Gas

During the course of the landfill gas monitoring program, which began in April 2003, Georgia-Pacific has implemented a series of contingency actions to address the detection of methane gas above the LEL (5% by volume). These contingency actions were documented in several communications to MDEQ, including letters from Georgia-Pacific to MDEQ dated July 26, 2006 and October 9, 2007 (Appendix A).

The steps taken to address methane gas at the KHL OU included:

- Increasing the frequency of landfill gas monitoring from annual to quarterly beginning in April 2003.
- Removing the paved access road and subgrade on the southern border of the KHL to release potentially trapped gases (completed in June and December 2003).
- Installing wind turbine ventilators on each of the 23 passive gas riser vents to further facilitate the venting of landfill gas (completed in June 2003).
- Installing a 100-foot long, 6-foot-deep, landfill gas cutoff trench to the west of the KHL (Trench A on Figure 28) in an effort to mitigate the potential migration of landfill gas to the adjacent Kalamazoo Metal Recyclers property (performed on November 28 and 29, 2003). This landfill gas cutoff trench also included three additional passive gas riser vents (V-4-1 through V-4-3) equipped with wind turbine ventilators, as shown on Figure 28.
- Installing a PVC liner trench on June 7, 2004 to the west of Trench A to serve as an enhanced barrier to obstruct lateral subsurface migration of methane gas that may potentially migrate past the cutoff trench.
- Installing five additional permanent gas monitoring probes (GW-5 through GW-9) on May 26, 2005 in the northern portion of the MDOT R-O-W to facilitate continued monitoring efforts.

- Installing a 150-foot-long, 10-foot-deep, landfill gas cutoff trench (Trench B on Figure 28) on April 17, 2006 to the west of the KHL in a continued effort to mitigate the potential migration of landfill gas to the adjacent Kalamazoo Metal Recyclers property. This additional landfill gas cutoff trench also included the installation of geotextile and HDPE as a barrier system, as well as three additional passive gas riser vents (V-4-4 through V-4-6) equipped with wind turbine ventilators.
- Installing three additional permanent gas monitoring probes (GW-10 through GW-12) – one on the southern side of King Highway within the R-O-W (GW-10), and two to the west of the previously installed cutoff trenches at the west of the KHL (GW-11 and GW-12). GW-10 and GW-11 were installed on June 21, 2005, and GW-12 was installed on April 17, 2006.
- Installing a 150-foot-long, 5-foot-deep, landfill gas cutoff trench (Trench C on Figure 28) in January 2008, along the inside of the fence in the southeast corner of the KHL, near gas monitoring probes GW-8 and GW-9. This additional landfill gas cutoff trench also included a barrier system in the form of a 40-mil PVC liner placed along the southern wall of the trench (the side closest to the fence), as well as 16 additional passive gas riser vents (V-2-3 through V-2-18) equipped with wind turbine ventilators.
- Installing a 200-foot-long, 10-foot-deep, landfill gas cutoff trench (Trench D on Figures 28 and 29) between January and April 2008, south of gas monitoring probe GW-1 and north of the site security fence. This additional landfill gas cutoff trench also included a barrier system in the form of a 40-mil PVC liner, as well as five additional passive gas riser vents (V-1-2 through V-1-6) equipped with wind turbine ventilators.

Subsequent landfill gas monitoring events documented that the implementation of these contingency actions effectively reduced methane gas concentrations to below the LEL in areas beyond the limits of Georgia-Pacific's property – thereby satisfactorily addressing the second deficiency identified in MDEQ's June 27, 2006 letter.

In addition, in June 2011, MDEQ recommended the expansion of the gas monitoring network. In response, in October 2011 Georgia-Pacific installed another five gas probes (GW-13 through GW-17) – two on the western side of the landfill, and three within the MDOT R-O-W on the southern side of the landfill (see Figure 28 for locations). Since 2011, during communications between MDEQ and Georgia-Pacific, it has been expressed that there are issues with methane associated with gas probes GW-13 and GW-14, including the potential need for mitigation, and relocating gas probe GW-15 north of the utility corridor along the south side of the KHL. Georgia-Pacific is currently reviewing potential measures to address the methane issues and gas probe location(s) along the western side of the KHL. All gas

monitoring locations and results to date are shown on Figure 24. Gas monitoring data are also presented in Table 8-1.

Construction plans and as-built details for the gas probes, four cutoff trenches, the PVC liner trench, gas vents, wind turbine ventilators are provided on Figures 30 and 31. Relevant QA/QC information (e.g., source of stone, grain-size analysis results, and PVC liner specifications) are presented in Appendix W. There is no relevant testing or QA/QC data for the PVC liner material used in the trenches, as the PVC was not intended to function as a non-permeable barrier. In addition, one continuous piece of PVC was used in each trench; therefore, there was no need for welding.

11.3 Addressing Residuals in the Right-of-Way

During installation of Trenches C and D (discussed above), residuals were observed. Given that such residuals were located outside of Georgia-Pacific's property (i.e., in the MDOT R-O-W), certain follow-up actions were required to address the residuals.

Initially, Georgia-Pacific and MDEQ met at the KHL on January 31, 2008 to conduct further investigation and discuss an approach for moving forward. Three test pits (TP-1 through TP-3, see Figure 29) were excavated immediately north of the site security fence, and samples were collected for PCB analysis. Georgia-Pacific verbally notified MDOT of the investigation and sampling following the site meeting, and the events were also summarized in an e-mail transmitted to MDOT on January 31, 2008 (Appendix A). The key steps taken from that point on to address the presence of residuals in the MDOT R-O-W are summarized below. All of the documents mentioned in this summary are included in Appendix A, and a more detailed chronology of events is presented in Table 11-1.

Residuals were addressed as follows:

- Georgia-Pacific submitted the *Proposed Activities in the Vicinity of the King Highway Right-of-Way Work Plan* on February 6, 2008 (ARCADIS February 2008; Appendix A) that described a soil boring program to be carried out to further delineate the extent of residuals. MDEQ approved the plan on February 8, 2008.
- Georgia-Pacific carried out the soil investigation on February 19 and 20, 2008 and completed the excavation of certain residuals in the MDOT R-O-W south of the site security fence on April 25, 2008. Soil investigation results and the plan for excavation were described in the *Soil Boring Investigation Results and Residuals Removal Work Plan for KHL OU* (ARCADIS April 2008; Appendix A). Georgia-Pacific secured an *Individual Application and Permit for Use of State Trunkline Right of Way* to work on MDOT property on March 21, 2008 (MDOT March 2008; Appendix A). During these excavation activities

conducted in April 2008, five areas of residuals were observed (referred to as R-1 through R-5) at or beyond the pre-defined limits of excavation.

- Construction work necessary to address the five areas of residuals in the R-O-W was initiated in May and June 2008 (as documented in the *Draft Summary of May 9, 2008 Conference Call to Discuss KHL OU* submitted to MDEQ on May 15, 2008 [ARCADIS May 2008; Appendix A]). Georgia-Pacific completed the following activities:
 - Re-excavated the R-1 area on May 19, 2008 and collected post-excavation confirmation samples from the excavation floor and excavation sidewall (Figure 29). All visible residuals were removed from this location on May 19, 2008.
 - Advanced four soil borings on May 21, 2008 in the R-2 through R-4 areas to determine the presence/extent of residuals (Figure 29). Based on samples from these soil borings, it was determined that no additional work was necessary in the R-3 and R-4 areas. Additional work was completed in the R-2 area, as described below.
 - Excavated a test pit south of the R-5 area on May 19, 2008 – based on the observation of residuals in the test pit, the R-5 area was excavated between May 22 and May 27, 2008 (Figure 29). Post-excavation confirmation samples were collected from the excavation floor and sidewalls. Excavation was temporarily postponed on May 28, 2008 for the collection of additional excavation sidewall samples for characterization purposes. Additional work was completed in the R-5 area, as described below.
 - Advanced two additional soil borings in the area of a previously collected post-excavation confirmation sample (ESW-4) on May 21, 2008 (located on the western edge of the R-2 area, Figure 29), where PCBs were detected at a concentration of 12.8 mg/kg. The PCB analytical result from one of the new soil borings (SB-18) confirmed the accuracy of the PCB analytical result for ESW-4. On June 11, 2008, the area of ESW-4 and SB-18 was re-excavated, and post-excavation confirmation samples were collected from the floor and sidewalls of the re-excavated area. Additional work was completed in the R-5 area, as described below.
- Georgia-Pacific summarized the ongoing investigation and remedial activities conducted in the R-O-W in the *Summary of Ongoing Efforts in the KHL/MDOT Right-of-Way* (Summary Report of Ongoing Efforts [ARCADIS June 2008; Appendix A]), which was submitted to MDEQ on June 19, 2008.

- After this phase of work, the key portions of the R-O-W left to be addressed were the areas identified as R-2 and R-5 (see Figure 29 for locations). Georgia-Pacific completed the following:
 - Conducted delineation and sampling work in the R-2 and R-5 areas on August 13-14, 2008 (as summarized in the *Progress Report on Activities Implemented in Response to State Letter Dated August 1, 2008* submitted to MDEQ on August 20, 2008 [ARCADIS August 2008; Appendix A])
 - Followed up with additional delineation, sampling, soil boring, and test pitting work west of the R-5 area the week of September 17, 2008 (described in the *Revised Work Plan for Additional Delineation and Sampling in the Right-of-Way at the KHL OU* submitted to MDEQ on September 16, 2008 [ARCADIS September 2008; Appendix A])
 - Remobilized to the KHL OU September 26, 2008 to advance additional borings to the west of the soil borings previously advanced west of the site access road, where residuals were observed during the work carried out earlier in September (see Figure 29 for all soil boring locations)
- All results of the sampling and delineation work were described in the *Summary of Additional Delineation Sampling at the R-2 and R-5 Areas*, submitted to MDEQ and Michigan Department of Attorney General (MDAG) on October 30, 2008 (ARCADIS October 2008; Appendix A) and presented in Table 11-2. Georgia-Pacific addressed comments received from MDEQ on December 11, 2008 (Appendix A), and submitted the final *Revised Summary of Additional Delineation Sampling at the R-2 and R-5 Areas* (ARCADIS February 2009; Appendix A) on February 18, 2009. At this point, the horizontal and vertical extent of PCB-containing soils within the MDOT R-O-W was determined to be sufficiently delineated in the R-2 and R-5 areas.
- The range of options for addressing the residuals remaining in the R-2 and R-5 areas was described in the *Evaluation of Scenarios and New Proposed Schedule for Completing Response Activities at the KHL OU* (ARCADIS December 2008; Appendix A), submitted to MDEQ on December 26, 2008. In this plan, the area of the MDOT R-O-W delineated for further action was identified as Parcel C (see Figure 28).
- Between January 2009 and August 2010, MDAG, MDEQ, MDOT, and Georgia-Pacific participated in a series of meetings and conference calls to come to agreement on the final course of action for Parcel C (as documented in Table 11-1). The agreed upon approach for Parcel C of the R-O-W included the following elements:

- Developing an Environmental License Agreement and a Notice of Environmental Conditions Affecting Property Controlled by the MDOT to place the necessary institutional controls on Parcel C (i.e., establishing financial assurance to protect MDOT against potential remedial costs incurred during future construction/ maintenance work in the R-O-W, establishing a deed notice to provide a means for notifying future owners of the conditions within Parcel C of the R-O-W, and placing permanent markers identifying the area of environmental contamination). These documents were signed on March 19, 2010 (Final License Agreement) and July 28, 2010 (Final Notice) (Appendix A). The License Agreement also included a permit application for Georgia-Pacific to conduct the final remedial work activities in Parcel C (as required by the terms of the Final License Agreement and Final Notice). MDOT issued the *Permit for Use of State Trunkline R-O-W* (MDOT July 2010; Appendix A) on July 26, 2010.
- Completing the final remedial work activities. Georgia-Pacific mobilized equipment, personnel, and materials to the KHL OU on August 30, 2010 to begin remedial work activities within the R-O-W. The remedial work activities included:
 - Excavating the top foot of soil material within Parcel C and disposing the excavated soil materials at a solid waste landfill
 - Placing an orange geotextile demarcation layer along the bottom of the excavation
 - Backfilling the excavated area with a minimum 1-foot-thick layer of imported clean topsoil
 - Grading and seeding/mulching the topsoil to promote proper drainage and facilitate revegetation of the excavated area

A local, licensed land surveyor provided survey control during the excavation to verify that excavation was conducted to the required horizontal and vertical limits. Following completion of remedial activities within the R-O-W, Georgia-Pacific submitted the *Completed Remedial Activities within the MDOT R-O-W Notification Letter* (ARCADIS December 2010; Appendix A) to MDEQ on December 28, 2010. MDEQ subsequently provided its approval of the completed remedial activities via an e-mail dated December 29, 2010 (Appendix A).

Following MDEQ's December 29, 2010 approval of the completed remedial activities within the R-O-W, the institutional control documents for Parcel C of the R-O-W (i.e., Final Notice and Final License Agreement) could be processed. Accordingly, MDOT recorded the Final Notice with the Kalamazoo County Register of Deeds on January 28, 2011 (Document Number: 2011-003092; Appendix A). With this information, Georgia-Pacific constructed the permanent

markers to be placed within and along the property boundary of Parcel C, and placed the permanent markers between May 11 and 18, 2011. This completed the work in the MDOT R-O-W.

11.4 Restrictive Covenant

Two draft Restrictive Covenants have been prepared for KHL OU and final details are being worked out between the State of Michigan and Georgia-Pacific. The first Restrictive Covenant covers the KHL Property portion of the OU, and the second covers the Mill Lagoons Property of the OU.

11.4.1 Restrictive Covenant for the KHL Property

The Restrictive Covenants prohibits all residential uses of the property subject to the Restrictive Covenants, and places significant limitations on activities that may be carried out on the property. The key elements of the Restrictive Covenants are briefly described below:

- Residential uses of the property are prohibited
- Activities that cause existing contamination to migrate beyond the property boundaries, exacerbate the existing contamination, or increase the cost of, or interfere with response activities are prohibited
- Use of the property is restricted to those activities necessary to implement, maintain, and monitor the RA
- Construction and use of wells to extract groundwater for all uses is prohibited, with the exception of groundwater extraction for sampling conducted in accordance with the O&M Plan
- Excavation or other intrusive activity that has the potential to affect the landfill cap is prohibited
- Construction of any new or additional buildings or structures within the property boundary is prohibited
- Removal or alteration of the permanent markers installed within the property boundary is prohibited

- Grant MDEQ and its designated representatives the right to enter the property at reasonable time for the purposes of determining and monitoring compliance with the ROD and AOC
- Notify MDEQ 14 days prior to the conveyance of any interest in the property

The KHL Property covered under the Restrictive Covenant includes Parcels 1, 2, 10, A, B and the Triangle Parcel as identified on Figure 3.

An Access License Easement under negotiation between the City of Kalamazoo and Georgia-Pacific provides the City and its contractors access across the KHL Property to access a city force main located at the northwest corner of the property. The access road covered by the easement is described on a survey that will be recorded with the Restrictive Covenant.

11.4.2 Restrictive Covenant on the Mill Lagoons Property

At the time of the 2007 Five-Year Review by USEPA, a decision had not been made regarding restrictions on the Mill Lagoons portion of the OU. Since the first Five-Year Review, Georgia-Pacific, in consultation with MDEQ and USEPA, has agreed to record a Restrictive Covenant for the Mill Lagoons restricting the uses of the property to substantially the same extent as the KHL as identified in Section 11.4.1. The Mill Lagoon Property covered under the Restrictive Covenant includes Mill Lagoons 1, 2, and 3 and Mill Lagoons 4 and 5 as identified on Figure 2A.

The following limited uses of the Mill Lagoon Property will be allowed.

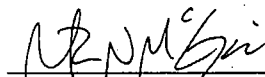
- A recreational trail crossing a portion of the Mill Lagoon Property that is owned and will be maintained by Kalamazoo County. On May 15, 2012, an easement between Georgia-Pacific and Kalamazoo County was executed, which allows access to the recreational non-motorized path, prescribes allowed uses, requires maintenance, and describes the area covered by the easement on which recreational uses are allowed by the Restrictive Covenant. The easement will be attached to and recorded with the Restrictive Covenant. The easement also acknowledges the superfund status of the Mill Lagoons Property and commits Kalamazoo County to comply with all laws and rules that apply to the Mill Lagoons Property. The draft Restrictive Covenant creates an express exception for recreational use for the easement area, fencing, and benches within the fenced area. Kalamazoo County has also provided its consent to the terms of the draft Restrictive Covenant for the Mill Lagoon Property, which will be recorded with the Restrictive Covenant. Surveys depicting the trail location will also be recorded with the Restrictive Covenant.

- An Access License Agreement allowing Kalamazoo County access to the Mill Lagoon Property to construct and maintain the non-motorized path crossing a portion of the Mill Lagoons Property. This Access License Agreement was also executed on May 15, 2012. The Access License Agreement grants a temporary construction license to Kalamazoo County for installing the recreational trail, prohibits soil excavation or removal, acknowledges the superfund status of the Mill Lagoon Property, and commits Kalamazoo County to comply with all laws and rules that apply to the Mill Lagoon Property. The license expired following completion of the trail.

Portions of the City of Kalamazoo sanitary sewer line, force main, and pump station are located on and under the Mill Lagoon Property and are served by an access road for maintenance. The sewer lines are identified in existing easements recorded at Liber 820, page 1483, and Liber 811, page 780. An Access License Agreement allowing for construction and maintenance of the force main, sewer line, and pump station in areas covered by the Restrictive Covenant is in place between the City of Kalamazoo and Georgia-Pacific. The Access License Agreement addresses the City's future plans for sewer improvements by providing for an allowed use within the sewer easements for sewer installation or maintenance work. The Access License Agreement will be recorded with the Restrictive Covenant for the Mill Lagoons Property and will reference the KHL Property as needed.

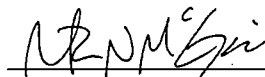
12. Certification Statements

To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.




Patrick N. McGuire
ARCADIS
Georgia-Pacific LLC Project Coordinator

To the best of our knowledge, based on our observations and testing, the King Highway Landfill Operable Unit Remedial Action activities discussed in this Final Report for Completion of Construction have been completed in full satisfaction of the requirements of the AOC.



Patrick N. McGuire
ARCADIS
Georgia-Pacific LLC Project Coordinator



William A. Rankin, III, P.E.
ARCADIS
Engineer of Record – Michigan P.E. License No. 44550

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Tables

**Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
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Table 3-1 -- Monitoring Well Construction Details

Well	Total Depth (ft) ¹	Outer Casing Interval (ft) ¹	Depth to Bottom of Screen (ft) ¹	Screen Length (ft)	Depth to Top of Screen (ft) ¹	Depth to Top of Sand (ft) ¹	Depth to Top of Bentonite (ft) ¹	Formation Screened
MW-1 ³	22.0	--	21.0	3.0	18.0	3.5	--	Fine to coarse gravel, sand, and silt
MW-1A ²	13.0	--	12.1	9.6	2.5	2.3	1.8	Fine to coarse sand, gravel and silt
MW-1AR	20.0	0.0 - 14.0	20.0	5.0	15.0	14.5	10.0	Fine to coarse sand, gravel, silt and clay
MW-2 ⁴	--	--	--	--	--	--	--	--
MW-2R	33.2	--	33.0	3.0	28.0	25.9	24.2	Fine to coarse sand, gravel, and silt
MW-3 ²	30.0	--	--	--	--	--	--	--
MW-3AR	14.0	0.0 - 7.0	13.0	5.0	8.0	7.0	3.0	Fine to coarse sand, gravel, silt and clay
MW-5 ³	--	--	--	--	--	--	--	--
MW-7	35.0	--	31.0	3.0	28.0	--	--	Fine to medium sand and gravel
MW-8A ²	24.0	--	22.5	4.6	17.9	17.9	14.9	Fine sand, silt, and gravel
MW-8AR	22.0	0.0 - 10.0	22.0	7.0	15.0	13.5	10.3	Fine to coarse sand, silt and clay
MW-8B ³	33.5	--	32.8	4.8	28.0	26.0	23.0	Fine to coarse sand, gravel, silt and clay
MW-8BR	29.0	0.0 - 13.0	28.5	5.0	23.5	23.0	20.0	Fine to coarse sand, gravel and silt
MW-9A ³	28.0	--	28.0	6.0	22.0	22.0	19.0	Fine to coarse gravel, sand, and silt
MW-9B ³	39.5	--	38.6	4.6	34.0	33.0	30.0	Fine to coarse gravel, sand, and silt
MW-9R ³	21.5	--	21.5	5.0	16.5	14.5	11.5	Grey paper fibers and clay
MW-10A ³	44.0	--	43.0	5.0	38.0	38.1	35.0	Fine to coarse sand, gravel, and silt
MW-10B ³	55.0	--	54.5	5.0	49.5	48.0	45.0	Fine to coarse sand and gravel
MW-10R ³	35.8	--	35.5	5.0	30.5	28.6	25.5	Fine gravel, sand, and silt
MW-11 ³	28.0	--	27.0	10.0	17.0	15.0	13.0	Fine to coarse sand
MW-11R ⁴	30.0	--	30.0	5.0	25.0	24.0	20.0	Fine to coarse sand
MW-11RR	29.0	--	29.0	5.0	24.0	24.0	20.0	Fine to coarse sand, gravel and silt
MW-12 ²	25.0	--	24.0	10.0	14.0	12.0	10.0	Fine to coarse sand, silt, and clay
MW-12AR	30.0	0.0 - 18.0	29.0	10.0	19.0	18.0	14.0	Fine to coarse sand, gravel and silt
MW-12B	36.0	0.0 - 19.5	35.5	5.0	30.5	30.0	27.0	Fine to medium silt, sand and clay
MW-13 ²	26.0	--	25.0	5.0	20.0	18.0	16.0	Fine to coarse sand
MW-13AR	22.0	0.0 - 11.7	22.0	5.0	17.0	15.0	12.0	Fine to medium sand, silt and clay
MW-13B	38.0	0.0 - 15.0	32.0	5.0	27.0	25.0	15.0	Fine to coarse sand, gravel, silt and clay
MW-14 ²	21.0	--	21.0	7.0	14.0	12.0	10.0	Fine sand
MW-14AR	14.0	0.0 - 6.0	14.0	7.0	7.0	6.6	3.4	Fine to coarse sand, gravel, silt and clay
MW-15 ²	17.5	--	17.5	7.0	10.5	9.0	7.0	Fine to medium sand
MW-15AR	14.0	0.0 - 6.0	14.0	7.0	7.0	6.5	3.7	Fine to coarse sand, gravel, silt and clay
MW-16A	20.0	0.0 - 12.0	20.0	7.0	13.0	12.5	11.0	Fine to coarse sand, gravel, silt and clay
MW-16B	28.0	0.0 - 15.0	28.0	5.0	23.0	22.0	20.0	Fine to coarse sand, gravel, silt and clay

Notes:

1. -- = Not applicable.

¹ The depth is referenced to ground surface.

² Wells abandoned between October 22 and 30, 2002.

³ Wells abandoned between July 13 and July 20, 1998 (i.e., MW-1, MW-5, MW-8B, MW-9A, MW-9B, MW-9R, MW-10A, MW-10B, and MW-10R) and between September 30 and October 2, 1998 (i.e., MW-11).

⁴ Wells abandoned in February 2000 (i.e., MW-11R) and on October 26, 2000 (i.e., MW-2).

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Table 4-1 -- Summary of PCB Soil Verification Sampling Results at KSSS

Sample ID	Sample Date	Total PCB ¹ (mg/kg)
Z18017	6/17/99	<0.33
Z18018	6/17/99	<0.33
Z18019	6/17/99	<0.33
Z18020	6/18/99	<0.33
Z18021 ²	6/18/99	2.1
Z18022	6/18/99	<0.33
Z18023	6/19/99	<0.33
Z18024	6/21/99	<0.33
Z18025	6/21/99	<0.33
Z18026	6/22/99	<0.33
Z18027	6/22/99	<0.33
Z18028	6/24/99	<0.33
Z18029 ²	6/30/99	<0.33

Notes:

¹ mg/kg = milligrams per kilogram.

² Sample location Z18021 was re-excavated and re-sampled as Z18029.

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Table 4-2 -- Summary of TCL/TAL Constituents at KSSS

Compound/Analyte	Sample Z18026 (mg/kg) ¹	Sample Z18027 (mg/kg) ¹
TAL - Metals/Inorganic Compounds		
Aluminum ²	2,700	990
Arsenic ²	1.1	1.9
Antimony ²	<0.50	<0.50
Barium ²	9.7	15
Beryllium ²	<0.20	<0.20
Cadmium ²	<0.05	0.07
Calcium	79,000	22,000
Chromium ²	7.2	3.8
Cobalt ²	2.7	1.5
Copper	3.6	3.4
Cyanide ³	<0.00002	<0.00002
Iron	5,700	3,700
Lead	2.2	8.7
Magnesium ²	16,000	3,200
Manganese	200	120
Mercury ²	<0.001	<0.10
Nickel	8.6	3.6
Potassium	240	140
Selenium ²	<0.20	<0.20
Sodium	100	66
Thallium ²	<0.50	<0.5
Vanadium	10	4
Zinc	15	23
TCL - Organic Compounds		
1,1,1-Trichloroethane	<0.05	<0.05
1,1,1,2-Tetrachloroethane	<0.10	<0.10
1,1,2-Trichloroethane	<0.05	<0.05
1,1-Dichloroethane	<0.05	<0.05
1,1-Dichloroethene	<0.05	<0.05
1,2-Dichloroethane	<0.05	<0.05
1,2-Dichloropropane	<0.05	<0.05
2-Butanone	<2.5	<2.5
2-Hexanone	<2.5	<2.5
4-Methyl-2-pentanone	<2.5	<2.5
Acetone	<5.0	<5.0
Benzene	<0.05	<0.05
Bromodichloromethane	<0.10	<0.10
Bromoform	<0.10	<0.10
Bromomethane	<0.20	<0.25
Carbon disulfide	<0.50	<0.25
Carbon tetrachloride	<0.05	<0.05
Chlorobenzene	<0.05	<0.05
Chloroethane	<0.25	<0.25
Chloroform	<0.05	<0.05
Chloromethane	<0.20	<0.25
Cis-1,2-dichloroethene	<0.05	<0.50
Cis-1,3-dichloropropene	<0.05	<0.50
Dibromochloromethane	<0.10	<0.10
Ethylbenzene	<0.05	<0.50
Methylene chloride	<0.25	<0.25
Styrene	<0.05	<0.50
Tetrachloroethene	<0.05	<0.50
Toluene	<0.10	<0.10
Trans-1,2-dichloroethene	<0.05	<0.50
Trans-1,3-Dichloropropene	<0.05	<0.50
Trichloroethene	<0.05	<0.50
Vinyl chloride	<0.10	<0.10
Xylenes	<0.15	<0.15
1,2,4-Trichlorobenzene 8270	<0.33	<0.33
1,2-Dichlorobenzene by 8270	<0.33	<0.33
1,3-Dichlorobenzene by 8270	<0.33	<0.33
Trans-1,3-Dichloropropene	<0.05	<0.50
Trichloroethene	<0.05	<0.50
Vinyl chloride	<0.10	<0.10

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Table 4-2 -- Summary of TCL/TAL Constituents at KSSS

Compound/Analyte	Sample Z18026 (mg/kg) ¹	Sample Z18027 (mg/kg) ¹
TCL - Organic Compounds (Cont.)		
Xylenes	<0.15	<0.15
1,2,4-Trichlorobenzene 8270	<0.33	<0.33
1,2-Dichlorobenzene by 8270	<0.33	<0.33
1,3-Dichlorobenzene by 8270	<0.33	<0.33
1,4-Dichlorobenzene by 8270	<0.33	<0.33
2,4,5-Trichlorophenol	<0.33	<0.33
2,4,6-Trichlorophenol	<0.33	<0.33
2,4-Dichlorophenol	<0.33	<0.33
2,4-Dimethylphenol	<0.33	<0.33
2,4-Dinitrophenol	<0.33	<0.33
2,4-Dinitrotoluene	<0.33	<0.33
2,6-Dinitrotoluene	<0.33	<0.33
2-Chloronaphthalene	<0.33	<0.33
2-Chlorophenol	<0.33	<0.33
2-Methyl-4,6-dinitrophenol	<0.33	<0.33
2-Methylnaphthalene	<0.33	<0.33
2-Methylphenol	<0.33	<0.33
2-Nitroaniline	<0.33	<0.33
2-Nitrophenol	<0.33	<0.33
3,3'-Dichlorobenzidine	<0.33	<0.33
3-Nitroaniline	<0.33	<0.33
4-Bromophenyl phenyl ether	<0.33	<0.33
4-Chloro-3-methylphenol	<0.33	<0.33
4-Chloroaniline	<0.33	<0.33
4-Chlorophenyl phenyl ether	<0.33	<0.33
4-Methylphenol	<0.33	<0.33
4-Nitroaniline	<0.33	<0.33
4-Nitrophenol	<0.33	<0.33
Acenaphthene	<0.33	<0.33
Acenaphthylene	<0.33	<0.33
Anthracene	<0.33	<0.33
Benzo(a)anthracene	<0.33	<0.33
Benzo(a)pyrene	<0.33	<0.33
Benzo(b)fluoranthene	<0.33	<0.33
Benzo(ghi)perylene	<0.33	<0.33
Benzo(k)fluoranthene	<0.33	<0.33
Bis(2-chloroethoxy)methane	<0.33	<0.33
Bis(2-chloroethyl)ether	<0.33	<0.33
Bis(2-chloroisopropyl)ether	<0.33	<0.33
Bis(2-ethylhexyl)phthalate	<0.33	<0.33
Butylbenzyl phthalate	<0.33	<0.33
Carbazole	<0.33	<0.33
Chrysene	<0.33	<0.33
Di-N-butylphthalate	<0.33	<0.33
Di-n-Octyl phthalate	<0.33	<0.33
Dibenzo(ah)anthracene	<0.33	<0.33
Dibenzofuran	<0.33	<0.33
Diethyl phthalate	<0.33	<0.33
Fluoranthene	<0.33	<0.33
Fluorene	<0.33	<0.33
Hexachlorobenzene	<0.33	<0.33
Hexachlorobutadiene	<0.33	<0.33
Hexachlorocyclopentadiene	<0.33	<0.33
Hexachloroethane	<0.33	<0.33
Indeno(123cd)pyrene	<0.33	<0.33
Isophorone	<0.33	<0.33
N-Nitrosodi-n-propylamine	<0.33	<0.33
N-Nitrosodiphenylamine	<0.33	<0.33
Naphthalene	<0.33	<0.33
Nitrobenzene	<0.33	<0.33
Pentachlorophenol	<0.33	<0.33
Phenanthrene	<0.33	<0.33
Phenol	<0.33	<0.33
Pyrene	<0.33	<0.33

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Table 4-2 -- Summary of TCL/TAL Constituents at KSSS

Compound/Analyte	Sample Z18026 (mg/kg) ¹	Sample Z18027 (mg/kg) ¹
TCL - Organic Compounds (Cont.)		
4,4'-DDD	<0.020	<0.020
4,4'-DDE	<0.020	<0.020
4,4'-DDT	<0.020	<0.020
Aldrin	<0.020	<0.020
Alpha-BHC	<0.020	<0.020
Beta-BHC	<0.020	<0.020
Chlordane, alpha	<0.025	<0.025
Chlordane, gamma	<0.025	<0.025
Delta-BHC	<0.020	<0.020
Dieldrin	<0.020	<0.020
Endosulfan I	<0.020	<0.020
Endosulfan II	<0.020	<0.020
Endosulfan sulfate	<0.020	<0.020
Endrin	<0.020	<0.020
Endrin aldehyde	<0.020	<0.020
Endrin ketone	<0.020	<0.020
Gamma-BHC	<0.020	<0.020
Heptachlor	<0.020	<0.020
Heptachlor epoxide	<0.020	<0.020
Methoxychlor	<0.050	<0.050
Toxaphene	<0.17	<0.17

Notes:

1. mg/kg = milligrams per kilogram.

¹ Sample results are reported to two significant figures.

² Sample results were reported as total, low level.

³ Sample results are reported in mg/kg.

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Table 4-3 -- Summary of Air Monitoring Results

Sample ID ¹	Sample Date	Total PCB (µg/m ³)
G1P001	5/13/99	<0.2
H1P001	5/13/99	<0.2
H2F001	5/13/99	<0.02
G1F001	5/13/99	<0.2
H2P001	5/13/99	<0.02
H1F001	5/13/99	<0.2
H2P002	5/14/99	<0.02
G1F002	5/14/99	<0.2
G1P002	5/14/99	<0.2
H1F002	5/14/99	<0.2
H2F002	5/14/99	<0.02
H1P002	5/14/99	<0.2
H1P003	5/15/99	<0.2
G1F003	5/15/99	<0.2
H1F003	5/15/99	<0.2
H2F003	5/15/99	<0.02
H2P003	5/15/99	<0.02
G1P003	5/15/99	<0.2
H1F004	5/16/99	<0.2
G1P004	5/16/99	<0.2
H2P004	5/16/99	<0.02
H2F004	5/16/99	<0.02
G1F004	5/16/99	<0.2
H1P004	5/16/99	<0.2
G1P005	5/18/99	<0.2
H2P005	5/18/99	<0.02
H1F005	5/18/99	<0.2
H2F005	5/18/99	<0.02
G1F005	5/18/99	<0.2
H1P005	5/18/99	<0.2
G1P006	6/11/99	<0.2
H2P006	6/11/99	<0.02
G1F006	6/11/99	<0.2
H2F006	6/11/99	<0.02
H1P006	6/11/99	<0.2
H1F006	6/11/99	<0.2
H1F007	6/12/99	<0.2
G1F007	6/12/99	<0.2
G1P008	6/12/99	<0.2
H2F007	6/12/99	<0.02
H1P007	6/12/99	<0.2
H2P007	6/12/99	<0.02
H2F008	6/15/99	<0.02
H2P008	6/15/99	<0.02
G1F008	6/15/99	<0.2
G1P008	6/15/99	<0.2
H1P008	6/15/99	<0.2
H1F008	6/15/99	<0.2
H2F009	6/17/99	<0.02
H2P009	6/17/99	<0.02
G1F009	6/17/99	<0.2
G1P009	6/17/99	<0.2
H1P009	6/17/99	<0.2
H1F009	6/17/99	<0.2
H2P010	6/18/99	<0.02
H2F010	6/18/99	<0.02
G1P010	6/18/99	<0.2
G1F010	6/18/99	<0.2
H1F010	6/18/99	<0.2
H1P010	6/18/99	<0.2
G2F011	6/19/99	<0.02
H2P011	6/19/99	<0.02
G1P011	6/19/99	<0.2
G1F011	6/19/99	<0.2
H1F011	6/19/99	<0.2

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Table 4-3 -- Summary of Air Monitoring Results

Sample ID ¹	Sample Date	Total PCB (µg/m ³)
H1P011	6/19/99	<0.2
H2P012	6/21/99	<0.02
H2F012	6/21/99	<0.02
H1F012	6/21/99	<0.2
H1P012	6/21/99	<0.2
H2F013	6/22/99	<0.02
H2P013	6/22/99	<0.02
H1P013	6/22/99	<0.2
H1F013	6/22/99	<0.2
H2F014	6/23/99	<0.02
H2P014	6/23/99	<0.02
H1F014	6/23/99	<0.2
H1P014	6/23/99	<0.2
H2P015	6/25/99	<0.02
H2F015	6/25/99	<0.02
H1P015	6/25/99	<0.2
H1F015	6/25/99	<0.2
H2P016	6/28/99	<0.02
H2F016	6/28/99	<0.02
G1P016	6/28/99	<0.2
G1F016	6/28/99	<0.2
H1F016	6/28/99	<0.2
H1P016	6/28/99	<0.2
H1P017	7/14/99	<0.2
H1F017	7/14/99	<0.2
H2P017	7/14/99	<0.02
H2F017	7/14/99	<0.02
G1F017	7/14/99	<0.2
G1P017	7/14/99	<0.2
H1F018	7/15/99	<0.2
H1P018	7/15/99	<0.2
H2F018	7/15/99	<0.02
H2P018	7/15/99	<0.02
G1F018	7/15/99	<0.2
G1P018	7/15/99	<0.2
G1P019	7/16/99	<0.2
H2F019	7/16/99	<0.02
H2P019	7/16/99	<0.02
G1F019	7/16/99	<0.2
H2F020	7/17/99	<0.02
H2P020	7/17/99	<0.02
G1F020	7/17/99	<0.2
G1P020	7/17/99	<0.2
H2F021	7/18/99	<0.02
H2P021	7/18/99	<0.02
G1F021	7/18/99	<0.2
G1P021	7/18/99	<0.2
H2P022	7/20/99	<0.02
H2F022	7/20/99	<0.02
G1P022	7/20/99	<0.2
G1F022	7/20/99	<0.2
H1F023	7/21/99	<0.2
H1P023	7/21/99	<0.2
H2P023	7/21/99	<0.02
H2F023	7/21/99	<0.02
G1P023	7/21/99	<0.2
G1F023	7/21/99	<0.2
H1F024	7/22/99	<0.2
H1P024	7/22/99	<0.2
H2P024	7/22/99	0.020 ²
H2F024	7/22/99	<0.02
G1P024	7/22/99	<0.2
G1F024	7/22/99	<0.2
H2P025	7/23/99	0.030 ²
H2F025	7/23/99	<0.02

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Table 4-3 -- Summary of Air Monitoring Results

Sample ID ¹	Sample Date	Total PCB (µg/m ³)
G1F025	7/23/99	<0.2
G1P025	7/23/99	<0.2
H1F025	7/23/99	<0.2
H1P025	7/23/99	<0.2
H2F026	7/24/99	<0.02
H2P026	7/24/99	<0.02
H2F027	7/26/99	<0.02
H2P027	7/26/99	0.020 ²
G1F027	7/26/99	<0.2
G1P027	7/26/99	<0.2
H1P027	7/26/99	<0.2
H1F027	7/26/99	<0.2
H2P028	7/27/99	<0.02
H2F028	7/27/99	<0.02
G1P028	7/27/99	<0.2
G1F028	7/27/99	<0.2
H1F028	7/27/99	<0.2
H1P028	7/27/99	<0.2
G1F029	7/29/99	<0.2
G1P029	7/29/99	<0.2
H2P030	7/30/99	<0.02
H2F030	7/30/99	<0.02
G1P030	7/30/99	<0.2
G1F030	7/30/99	<0.2
H1F030	7/30/99	<0.2
H1P030	7/30/99	<0.2
H2F031	7/31/99	<0.02
H2P031	7/31/99	<0.02
G1F031	7/31/99	<0.2
G1P031	7/31/99	<0.2
H1F031	7/31/99	<0.2
H1P031	7/31/99	<0.2
H2P032	8/3/99	<0.02
H2F032	8/3/99	<0.02
G1P032	8/3/99	<0.2
G1F032	8/3/99	<0.2
H1P032	8/3/99	<0.2
H1F032	8/3/99	<0.2
H2P033	8/5/99	<0.02
H2F033	8/5/99	<0.02
G1F033	8/5/99	<0.2
G1P033	8/5/99	<0.2
H1P033	8/5/99	<0.2
H1F033	8/5/99	<0.2
H1F034	8/9/99	<0.2
H1P034	8/9/99	<0.2
H2F034	8/9/99	<0.02
H2P034	8/9/99	<0.02
G1P034	8/9/99	<0.2
G1F034	8/9/99	<0.2
H1P035	8/10/99	<0.2
H1F035	8/10/99	<0.2
G1P035	8/10/99	<0.2
G1F035	8/10/99	<0.2
H2P035	8/10/99	<0.02
H2F035	8/10/99	<0.02
H2P036	8/11/99	<0.02
H2F036	8/11/99	<0.02
H1P036	8/11/99	<0.2
H1F036	8/11/99	<0.2
G1F036	8/11/99	<0.2
G1P036	8/11/99	<0.2
H2F037	8/12/99	<0.02
H2P037	8/12/99	<0.02
H1F037	8/12/99	<0.2

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Table 4-3 -- Summary of Air Monitoring Results

Sample ID ¹	Sample Date	Total PCB (µg/m ³)
H1P037	8/12/99	<0.2
G1F038	8/13/99	<0.2
G1P038	8/13/99	<0.2
H2F038	8/13/99	<0.02
H2P038	8/13/99	<0.02
H1P039	8/16/99	<0.2
H1F039	8/16/99	<0.2
H2F039	8/16/99	<0.02
H2P039	8/16/99	<0.02
G1F039	8/16/99	<0.2
G1P039	8/16/99	<0.2
H2P040	8/17/99	<0.02
H2F040	8/17/99	<0.02
H1P040	8/17/99	<0.2
H1F040	8/17/99	<0.2
G1P040	8/17/99	<0.2
G1F040	8/17/99	<0.2
H2F041	8/18/99	<0.02
H2P041	8/18/99	<0.02
H1F041	8/18/99	<0.2
H1P041	8/18/99	<0.2
G1P041	8/18/99	<0.2
G1F041	8/18/99	<0.2
H2P042	8/19/99	<0.02
H2F042	8/19/99	<0.02
H1P042	8/19/99	<0.2
H1F042	8/19/99	<0.2
G1F042	8/19/99	<0.2
G1P042	8/19/99	<0.2
H2P043	8/20/99	<0.02
H2F043	8/20/99	<0.02
H1F043	8/20/99	<0.2
H1P043	8/20/99	<0.2
G1P043	8/20/99	<0.2
G1F043	8/20/99	<0.2
H2F044	8/23/99	<0.02
H2P044	8/23/99	<0.02
H1F044	8/23/99	<0.2
H1P044	8/23/99	<0.2
G1F044	8/23/99	<0.2
G1P044	8/23/99	<0.2
H2F045	8/24/99	<0.02
H2P045	8/24/99	<0.02
H1F045	8/24/99	<0.2
H1P045	8/24/99	<0.2
G1P045	8/24/99	<0.2
G1F045	8/24/99	<0.2
H2F046	8/25/99	<0.02
H2P046	8/25/99	<0.02
H1P046	8/25/99	<0.2
H1F046	8/25/99	<0.2
G1P046	8/25/99	<0.2
G1F046	8/25/99	<0.2
H2F047	8/26/99	<0.02
H2P047	8/26/99	<0.02
H1F047	8/26/99	<0.2
H1P047	8/26/99	<0.2
G1F047	8/26/99	<0.2
G1P047	8/26/99	<0.2
H2F048	8/27/99	<0.02
H2P048	8/27/99	<0.02
H1P048	8/27/99	<0.2
H1F048	8/27/99	<0.2
G1P048	8/27/99	<0.2
G1F048	8/27/99	<0.2

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Table 4-3 -- Summary of Air Monitoring Results

Sample ID ¹	Sample Date	Total PCB (µg/m ³)
H2P049	8/30/99	0.030 ²
H2F049	8/30/99	<0.02
H1P049	8/30/99	<0.2
H1F049	8/30/99	<0.2
G1F049	8/30/99	<0.2
G1P049	8/30/99	<0.2
H2F050	8/31/99	<0.02
H2P050	8/31/99	<0.02
H1F050	8/31/99	<0.2
H1P050	8/31/99	<0.2
G1F050	8/31/99	<0.2
G1P050	8/31/99	<0.2
H2F051	9/1/99	<0.02
H2P051	9/1/99	<0.02
H1F051	9/1/99	<0.2
H1P051	9/1/99	<0.2
G1P051	9/1/99	<0.2
G1F051	9/1/99	<0.2
H2F052	9/2/99	<0.02
H2P052	9/2/99	<0.02
H1P052	9/2/99	<0.2
H1F052	9/2/99	<0.2
H2F053	9/3/99	<0.02
H2P053	9/3/99	<0.02
H1F053	9/3/99	<0.2
H1P053	9/3/99	<0.2
H2F055	9/8/99	<0.02
H1F055	9/8/99	<0.2
G1P055	9/8/99	<0.2
H1P055	9/8/99	<0.2
G1F055	9/8/99	<0.2
H2P055	9/8/99	<0.02
H2F056	9/9/99	<0.02
G1P056	9/9/99	<0.2
H1F056	9/9/99	<0.2
H2P056	9/9/99	<0.02
H1P056	9/9/99	<0.2
G1F056	9/9/99	<0.2
H2F057	9/10/99	<0.02
H1P057	9/10/99	<0.2
G1P057	9/10/99	<0.2
H2P057	9/10/99	<0.02
G1F057	9/10/99	<0.2
H1F057	9/10/99	<0.2
H2P058	9/11/99	<0.02
H2F058	9/11/99	<0.02
H1P058	9/11/99	<0.2
G1F058	9/11/99	<0.2
H1F058	9/11/99	<0.2
G1P058	9/11/99	<0.2
H2P059	9/14/99	<0.02
H2F059	9/14/99	<0.02
H1P059	9/14/99	<0.2
G1F059	9/14/99	<0.2
H1F059	9/14/99	<0.2
G1P059	9/14/99	<0.2
G1F060	9/15/99	<0.2
H2P060	9/15/99	0.020 ²
G1P060	9/15/99	<0.2
H2F060	9/15/99	<0.02
H2P061	9/16/99	<0.02
H2F061	9/16/99	<0.02
H1F062	9/17/99	<0.2
H1P062	9/17/99	<0.2
H2P062	9/17/99	0.020 ²

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Table 4-3 -- Summary of Air Monitoring Results

Sample ID ¹	Sample Date	Total PCB (µg/m ³)
H2F062	9/17/99	<0.02
H1F063	9/18/99	<0.2
H2P063	9/18/99	<0.02
H1P063	9/18/99	<0.2
H2F063	9/18/99	<0.02
H1F064	9/21/99	<0.2
H1P064	9/21/99	<0.2
H2F064	9/21/99	<0.02
H2P064	9/21/99	<0.02
H2F065	9/22/99	<0.02
G1P065	9/22/99	<0.2
H2P065	9/22/99	<0.02
G1F065	9/22/99	<0.2
H1P065	9/22/99	<0.2
H1F065	9/22/99	<0.2
H1P066	9/23/99	<0.2
G1P066	9/23/99	<0.2
H1F066	9/23/99	<0.2
H2F066	9/23/99	<0.02
H2P066	9/23/99	<0.02
G1F066	9/23/99	<0.2
H2F067	9/24/99	<0.02
H2P067	9/24/99	0.020 ²
H2P068	9/25/99	<0.02
H2F068	9/25/99	<0.02
H2P069	9/27/99	<0.02
H2F069	9/27/99	<0.02
H2F070	9/28/99	<0.02
H1P070	9/28/99	<0.2
H2P070	9/28/99	0.030 ²
H1F070	9/28/99	<0.2
H1F071	9/29/99	<0.2
H1P071	9/29/99	<0.2
H1F072	9/30/99	<0.2
H1P072	9/30/99	<0.2
H1F073	10/1/99	<0.2
H1P073	10/1/99	<0.2
H1P074	10/4/99	<0.2
H1F074	10/4/99	<0.2
H1P075	10/6/99	<0.2
H1F075	10/6/99	<0.2
H2F075	10/6/99	<0.02
H2P075	10/6/99	<0.02
H1F076	10/7/99	<0.2
H2P076	10/7/99	<0.02
H1P076	10/7/99	<0.2
H2F076	10/7/99	<0.02
H2P077	10/8/99	<0.02
H1P077	10/8/99	<0.2
H1F077	10/8/99	<0.2
H2F077	10/8/99	<0.02
H2P078	10/9/99	<0.02
H1F078	10/9/99	<0.2
H1P078	10/9/99	<0.2
H2F078	10/9/99	<0.02
H2P079	10/11/99	<0.02
H1P079	10/11/99	<0.2
H2F079	10/11/99	<0.02
H1F079	10/11/99	<0.2
H2P080	10/12/99	<0.02
H2F080	10/12/99	<0.02
H2F081	10/13/99	<0.02
H2P081	10/13/99	<0.02
H2F082	10/14/99	<0.02
H1P082	10/14/99	<0.2

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Table 4-3 -- Summary of Air Monitoring Results

Sample ID ¹	Sample Date	Total PCB (µg/m ³)
H1F082	10/14/99	<0.2
H2P082	10/14/99	<0.02
H1F083	10/15/99	<0.2
H1P083	10/15/99	<0.2
H2P083	10/15/99	<0.02
H2F083	10/15/99	<0.02
H1F084	10/16/99	<0.2
H1P084	10/16/99	<0.2
H2P084	10/16/99	<0.02
H2F084	10/16/99	<0.02
H2F085	10/18/99	<0.02
H1F085	10/18/99	<0.2
H1P085	10/18/99	<0.2
H2P085	10/18/99	<0.02
H2F086	10/19/99	<0.02
H1F086	10/19/99	<0.2
H1P086	10/19/99	<0.2
H2P086	10/19/99	<0.02
H1F087	10/20/99	<0.2
H1P087	10/20/99	<0.2
H2F087	10/20/99	<0.02
H2P087	10/20/99	<0.02
H2F088	10/21/99	<0.02
H1P088	10/21/99	<0.2
H2P088	10/21/99	<0.02
H1F088	10/21/99	<0.2
H1P089	10/22/99	<0.2
H2P089	10/22/99	<0.02
H1F089	10/22/99	<0.2
H2F089	10/22/99	<0.02
H2F090	10/23/99	<0.02
H1F090	10/23/99	<0.2
H1P090	10/23/99	<0.2
H2P090	10/23/99	<0.02
H1P091	10/25/99	<0.2
H2F091	10/25/99	<0.02
H2P091	10/25/99	<0.02
H1F091	10/25/99	<0.2
H2P092	10/26/99	<0.02
H2F092	10/26/99	<0.02
H2F093	10/27/99	<0.02
H2P093	10/27/99	<0.02
H2F094	10/28/99	<0.02
H2P094	10/28/99	<0.02
H2F095	10/29/99	<0.02
H2P095	10/29/99	<0.02
H2P096	10/30/99	<0.02
H1P096	10/30/99	<0.2
H1F096	10/30/99	<0.2
H2F096	10/30/99	<0.02
G1F098	11/2/99	<0.2
H2P097	11/2/99	<0.02
G1P098	11/2/99	<0.2
H2P098	11/2/99	<0.02
H1F098	11/2/99	<0.2
H1P097	11/2/99	<0.2
H1F097	11/2/99	<0.2
H1P098	11/2/99	<0.2
H2F098	11/2/99	<0.02
H2F097	11/2/99	<0.02

Notes:

1. ND = Non Detect.

2. µg/m³ = micrograms per cubic meter.

¹ Air samples collected between 5/13/99 and 9/30/99, between 6/11/99 and 6/28/99, and between 8/5/99 and 10/4/99 pertain to activities conducted at the Mill Lagoons, the King Street Storm Sewer, and the Areas Directly Adjacent to the KHL, respectively.

² MDEQ was notified of any PCB detections as a result of monitoring, and engineering controls were implemented.

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Table 4-4 -- Summary of Turbidity Monitoring at KSSS

Date	Location ^{1,2}	Total Water Depth (ft) ³	Turbidity (NTU)	% Difference ⁴
6/15/99	U	2	16	0
6/15/99	D	3	16	
6/16/99	U	3	18	0
6/16/99	D	4	18	
6/17/99	U	2	19	5
6/17/99	D	3	20	
6/18/99	U	2	15	6
6/18/99	D	3	16	
6/19/99	U	2	17	0
6/19/99	D	3	17	
6/21/99	U	2	13	0
6/21/99	D	3	13	
6/22/99	U	2	16	6
6/22/99	D	3	17	
6/23/99	U	2	16	6
6/23/99	D	3	17	
6/24/99	U	2	16	0
6/24/99	D	3	16	
6/25/99	U	2	26	0
6/25/99	D	3	26	

Notes:

1. ft = feet.

2. NTU = Nephelometric Turbidity Units.

¹ U = Monitoring was conducted 100 feet upstream of remedial activities.

² D = Monitoring was conducted 100 feet downstream of remedial activities.

³ Monitoring was conducted at mid-depth approximately 25 feet from the riverbank.

⁴ % Difference = Percent difference between the upstream and downstream turbidity results.

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Table 5-1 -- Summary of Turbidity Monitoring at Areas Directly Adjacent to the KHL OU

Date	Location ^{1,2}	Total Water Depth (ft) ³	Turbidity (NTU)	% Difference ⁴
9/8/99	D	0.5	6	0
9/8/99	U	0.5	6	
9/9/99	D	0.5	7	-13
9/9/99	U	0.5	8	
9/13/99	D	0.5	9	0
9/13/99	U	0.5	9	
9/17/99	D	0.5	15	0
9/17/99	U	0.5	15	
9/18/99	D	0.5	13	15
9/18/99	U	0.5	11	
9/19/99	D	0.5	11	9
9/19/99	U	0.5	10	
9/21/99	D	0.5	11	0
9/21/99	U	0.5	11	
9/22/99	D	0.5	10	-10
9/22/99	U	0.5	11	
9/23/99	D	0.5	11	-8
9/23/99	U	0.5	12	
9/24/99	D	0.5	16	-6
9/24/99	U	0.5	17	
9/27/99	D	0.5	12	8
9/27/99	U	0.5	11	
9/28/99	D	0.5	13	0
9/28/99	U	0.5	13	
9/2/99	D	0.5	9	11
9/2/99	U	0.5	8	
9/3/99	D	0.5	8	0
9/3/99	U	0.5	8	
9/4/99	D	0.5	6	0
9/4/99	U	0.5	6	
7/31/99	D	2	18	0
7/31/99	U	2	18	
8/4/99	D	2	19	5
8/4/99	U	2	18	
8/5/99	D	2	20	5
8/5/99	U	2	19	

Notes:

1. ft = feet.

2. NTU = Nephelometric Turbidity Units.

¹ U = Monitoring was conducted 100 feet upstream of remedial activities.

² D = Monitoring was conducted 100 feet downstream of remedial activities.

³ Monitoring was conducted at mid-depth approximately 25 feet from the riverbank.

⁴ % Difference = Percent difference between the upstream and downstream turbidity results.

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Table 6-1 -- TCL/TAL Constituents at the Mill Lagoons

Compound/Analyte	Sample G52080 (mg/kg) ¹	Sample G52085 (mg/kg) ¹	Sample G52108 (mg/kg) ¹	Sample G52109 (mg/kg) ¹	Sample G52110 (mg/kg) ¹	Sample G52111 (mg/kg) ¹
TCL - SVOC						
1,1,1-Trichloroethane	--	--	<0.050	<0.050	<0.050	<0.050
1,1,1,2-Tetrachloroethane	--	--	<0.10	<0.10	<0.10	<0.10
1,1,2-Trichloroethane	--	--	<0.050	<0.050	<0.050	<0.050
1,1-Dichloroethane	--	--	<0.050	<0.050	<0.050	<0.050
1,1-Dichloroethene	--	--	<0.050	<0.050	<0.050	<0.050
1,2-Dichloroethane	--	--	<0.050	<0.050	<0.050	<0.050
1,2-Dichloropropane	--	--	<0.050	<0.050	<0.050	<0.050
2-Butanone	--	--	<2.5	<2.5	<2.5	<2.5
2-Hexanone	--	--	<2.5	<2.5	<2.5	<2.5
4-Methyl-2-pentanone	--	--	<2.5	<2.5	<2.5	<2.5
Acetone	--	--	<5.0	<5.0	<5.0	<5.0
Benzene	--	--	<0.050	<0.050	<0.050	<0.050
Bromodichloromethane	--	--	<0.10	<0.10	<0.10	<0.10
Bromoform	--	--	<0.10	<0.10	<0.10	<0.10
Bromomethane	--	--	<0.25	<0.25	<0.25	<0.25
Carbon disulfide	--	--	<0.25	<0.25	<0.25	<0.25
Carbon tetrachloride	--	--	<0.050	<0.050	<0.050	<0.050
Chlorobenzene	--	--	<0.050	<0.050	<0.050	<0.050
Chloroethane	--	--	<0.25	<0.25	<0.25	<0.25
Chloroform	--	--	<0.050	<0.050	<0.050	<0.050
Chloromethane	--	--	<0.25	<0.25	<0.25	<0.25
Cis-1,2-dichloroethene	--	--	<0.050	<0.050	<0.050	<0.050
Cis-1,3-dichloropropene	--	--	<0.050	<0.050	<0.050	<0.050
Dibromochloromethane	--	--	<0.10	<0.10	<0.10	<0.10
Ethylbenzene	--	--	<0.050	<0.050	<0.050	<0.050
Methylene chloride	--	--	<0.25	<0.25	<0.25	<0.25
Styrene	--	--	<0.050	<0.050	<0.050	<0.050
Tetrachloroethene	--	--	<0.050	<0.050	<0.050	<0.050
Toluene	--	--	<0.10	<0.10	<0.10	<0.10
Trans-1,2-dichloroethene	--	--	<0.050	<0.050	<0.050	<0.050
Trans-1,3-Dichloropropene	--	--	<0.050	<0.050	<0.050	<0.050
Trichloroethene	--	--	<0.050	<0.050	<0.050	<0.050
Vinyl chloride	--	--	<0.10	<0.10	<0.10	<0.10
Xylenes	--	--	<0.15	<0.15	<0.15	<0.15
1,2,4-Trichlorobenzene 8270	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
1,2-Dichlorobenzene by 8270	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
1,3-Dichlorobenzene by 8270	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
1,4-Dichlorobenzene by 8270	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
2,4,5-Trichlorophenol	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
2,4,6-Trichlorophenol	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
2,4-Dichlorophenol	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
2,4-Dimethylphenol	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
2,4-Dinitrophenol	<1.3	<1.3	<2.0	<0.66	<0.66	<2.0
2,4-Dinitrotoluene	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
2,6-Dinitrotoluene	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
2-Chloronaphthalene	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
2-Chlorophenol	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
2-Methyl-4,6-dinitrophenol	<1.3	<1.3	<2.0	<0.66	<0.66	<2.0
2-Methylnaphthalene	<0.33	<0.33	1.5	<0.33	<0.33	<1.0
2-Methylphenol	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
2-Nitroaniline	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
2-Nitrophenol	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
3,3'-Dichlorobenzidine	<1.3	<1.3	<2.0	<0.66	<0.66	<2.0
3-Nitroaniline	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
4-Bromophenyl phenyl ether	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
4-Chloro-3-methylphenol	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
4-Chloroaniline	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
4-Chlorophenyl phenyl ether	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
4-Methylphenol	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
4-Nitroaniline	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
4-Nitrophenol	<1.3	<1.3	<2.0	<0.66	<0.66	<2.0
Acenaphthene	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
Acenaphthylene	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
Anthracene	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0

See Notes on Page 3.

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Table 6-1 -- TCL/TAL Constituents at the Mill Lagoons

Compound/Analyte	Sample G52080 (mg/kg) ¹	Sample G52085 (mg/kg) ¹	Sample G52108 (mg/kg) ¹	Sample G52109 (mg/kg) ¹	Sample G52110 (mg/kg) ¹	Sample G52111 (mg/kg) ¹
TCL - SVOC (Cont.)						
Benzo(a)anthracene	<0.33	<0.33	1.3	<0.33	<0.33	2.5
Benzo(a)pyrene	<0.33	<0.33	2.1	<0.33	<0.33	2.1
Benzo(b)fluoranthene	<0.33	<0.33	4.0	<0.33	<0.33	4.5
Benzo(ghi)perylene	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
Benzo(k)fluoranthene	<0.33	<0.33	2.0	<0.33	<0.33	2.0
Bis(2-chloroethoxy)methane	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
Bis(2-chloroethyl)ether	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
Bis(2-chloroisopropyl)ether	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
Bis(2-ethylhexyl)phthalate	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
Butylbenzyl phthalate	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
Carbazole	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
Chrysene	<0.33	<0.33	2.1	<0.33	<0.33	2.4
Di-N-butylphthalate	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
Di-n-Octyl phthalate	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
Dibenzo(ah)anthracene	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
Dibenzofuran	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
Diethyl phthalate	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
Dimethyl phthalate	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
Fluoranthene	<0.33	0.36	4.4	0.49	<0.33	3.5
Fluorene	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
Hexachlorobenzene	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
Hexachlorobutadiene	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
Hexachlorocyclopentadiene	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
Hexachloroethane	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
Indeno(123cd)pyrene	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
Isophorone	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
N-Nitrosodi-n-propylamine	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
N-Nitrosodiphenylamine	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
Naphthalene	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
Nitrobenzene	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
Pentachlorophenol	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
Phenanthrene	<0.33	<0.33	1.8	<0.33	<0.33	1.5
Phenol	<0.33	<0.33	<1.0	<0.33	<0.33	<1.0
Pyrene	<0.33	<0.33	4.9	0.49	<0.33	9.4
4,4'-DDD	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
4,4'-DDE	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
4,4'-DDT	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Aldrin	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Alpha-BHC	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Beta-BHC	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Chlordane	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Chlordane, alpha	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Chlordane, gamma	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Delta-BHC	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Dieldrin	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Endosulfan I	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Endosulfan II	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Endosulfan sulfate	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Endrin	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Endrin aldehyde	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Endrin ketone	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Gamma-BHC	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Heptachlor	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Heptachlor epoxide	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Methoxychlor	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Toxaphene	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17
TAL - Metals/Inorganic Compounds						
Aluminum	2,500	2,100	3,300	2,900	2,800	3,800
Antimony	1.9	0.81	1.4	<0.50	<0.50	1.6
Arsenic	3.9	7.9	27.0	4.4	3.2	15
Barium	50	28	92	32	28	88
Beryllium	0.30	0.46	0.65	0.22	0.28	0.83
Cadmium	0.42	0.33	0.75	0.44	0.30	0.74
Calcium	73,000	22,000	20,000	32,000	3,200	13,000

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Table 6-1 -- TCL/TAL Constituents at the Mill Lagoons

Compound/Analyte	Sample G52080 (mg/kg) ¹	Sample G52085 (mg/kg) ¹	Sample G52108 (mg/kg) ¹	Sample G52109 (mg/kg) ¹	Sample G52110 (mg/kg) ¹	Sample G52111 (mg/kg) ¹
TAL - Metals/Inorganic Compounds (Cont.)						
Chromium ²	9	4	12	10	7.6	16
Cobalt	3	3.4	3.7	2.4	2.8	5
Copper	52	21	37	19	15	55
Cyanide	0.50	0.20	0.50	<0.20	<0.20	0.50
Iron	5,700	6,600	15,000	6,400	6,500	18,000
Lead	56.0	25.0	6.0	16.0	13	91.0
Magnesium	4,900	4,200	3,900	7,100	7,700	2,800
Manganese	150	130	340	200	16	29
Mercury ²	0.003	<0.001	1.6	<0.10	<0.10	0.24
Nickel	5	8	10	7	7	14
Potassium	340	320	330	360	380	310
Selenium	0.60	<0.20	1.5	<0.20	0.50	2.6
Silver	<0.50					
Sodium	190	97	170	65	70	110
Thallium	<0.50					
Vanadium	11	11	14	18	12	21
Zinc	86	51	130	28	27	200

Notes:

1. -- = Not applicable.

2. mg/kg = milligrams per kilogram.

3. TCL = target compound list.

4. TAL = target analyte list.

5. SVOCs = semi-volatile organic compounds.

¹ Sample results are reported to two significant figures.

² Chromium and mercury are each reported as total, low-level.

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Table 6-2 -- Summary of PCB Soil Verification Sampling Results for Mill Lagoons 1, 2, and 3

Sample ID	Sample Date	Total PCB (mg/kg)
G52057	7/22/99	< 0.33
G52058	7/22/99	< 0.33
G52059	7/22/99	< 0.33
G52060	7/22/99	< 0.33
G52061	7/28/99	< 0.33
G52062	7/28/99	< 0.33
G52063	7/28/99	< 0.33
G52064	7/28/99	< 0.33
G52065	7/28/99	< 0.33
G52066	8/5/99	0.58
G52067	8/5/99	< 0.33
G52068	8/5/99	0.44
G52069	8/5/99	0.37
G52070	8/5/99	< 0.33
	Mean ¹	0.23
	Standard Deviation ¹	0.13
	95% UCL ¹	0.30

Notes:

1. mg/kg = milligrams per kilogram.

¹ One half the detection limit was used in the calculation of the mean, standard deviation, and 95% UCL.

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Table 6-3 -- Summary of PCB Soil Verification Sampling Results for Re-Excavated Areas of Mill Lagoons 1, 2, 3, and 5

Sample ID ^{1,2,3,4}	Sample Date	Total PCB (mg/kg)
G52095	9/16/99	< 0.33
G52096	9/16/99	0.67
G52097	9/16/99	< 0.33
G52098	9/16/99	< 0.33
G52099	9/16/99	< 0.33
G52100	9/16/99	< 0.33
G52101	9/16/99	< 0.33
G52102	9/16/99	1.1
G52103	9/23/99	0.66
G52104	9/23/99	2.6
G52105	9/23/99	< 0.33
G52106	9/23/99	< 0.33
G52107	9/23/99	< 0.33

Notes:

1. mg/kg = milligrams per kilogram.

¹ Samples G52095 through G52097 were collected from Mill Lagoons 1, 2, and 3.

² Samples G52099 through G52102 were collected from Mill Lagoon 5.

³ Samples G52103 through G52107 were collected from Mill Lagoon 2.

⁴ Sample G52098 was collected from the Floodplain Area.

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Table 6-4 -- Soil Verification Sampling Ensys® Field Test Kit Results for Area South of Mill Lagoon 3

Sample ID	Soil Description	1.7 mg/kg Test	9.2 mg/kg Test
1	Brown fine to medium grained sand	Pass	Pass
3	Light brown fine to medium grained sand	Pass	Pass
8	Brown fine to medium grained sand and clay	Fail	Pass
10	Brown fine to medium grained sand	Pass	Pass
10 duplicate	Brown fine to medium grained sand	Pass	Pass
11	Gray medium to coarse grained sand	Fail	Fail ¹
TP	Gray brittle clay	Fail	Fail ¹
DS	Gray brittle clay	Fail	Fail ¹

Notes:

1. mg/kg = milligrams per kilogram.

¹ Areas that failed the 9.2 mg/kg test were re-excavated.

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Table 6-5 -- Summary of PCB Soil Verification Sampling for Mill Lagoon 4

Sample ID	Sample Date	Total PCB (mg/kg) ¹
G52043	6/2/99	< 0.33
G52044	6/2/99	7.9
G52045	6/2/99	< 0.33
G52046	6/2/99	< 0.33
G52047	6/2/99	< 0.33
G52048 ²	6/2/99	12
G52049	6/2/99	< 0.33
G52050	6/2/99	< 0.33
G52051	6/2/99	1.0
G52052	6/2/99	< 0.33
G52053	6/2/99	< 0.33
G52054	6/2/99	< 0.33
G52055	6/2/99	< 0.33
G52056	6/2/99	< 0.33
Before Re-excavating Samples that Exceeded the Criteria ⁴	Mean ³	1.6
	Standard Deviation ³	3.6
	95% UCL ³	3.50

Notes:

¹ mg/kg = milligrams per kilogram.

² The area around sample G52048 was re-excavated and verification samples G52048A through G52048H were collected in March and April 2009 around the approximate coordinates of G52048, with all sample results non-detect for PCBs.

³ One half the detection limit was used in the calculation of the mean, standard deviation, and 95% UCL.

⁴ Calculation of the arithmetic mean, standard deviation, and 95% UCL used all sample results shown.

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Table 6-6 -- Summary of PCB Soil Verification Sampling for Mill Lagoon 5

Sample ID ^{1,2}	Sample Date	Total PCB (mg/kg) ³
G52071	8/31/99	23
G52072	8/31/99	18
G52073	8/31/99	1.9
G52074	8/31/99	170
G52075	8/31/99	11
G52076	8/31/99	23
G52077	8/31/99	39
G52078	8/31/99	99.0
G52079	8/31/99	6.1
G52080	8/31/99	0.69
G52081	8/31/99	< 0.33
G52082	8/31/99	0.41
G52083	8/31/99	< 0.33
G52084	8/31/99	< 0.33
G52085	8/31/99	< 0.33
G52086	8/31/99	< 0.33
G52087	8/31/99	< 0.33
G52088	8/31/99	< 0.33
G52089	8/31/99	< 0.33
G52090	8/31/99	< 0.33
G52091	8/31/99	< 0.33
G52092 ⁴	8/31/99	120
G52093	8/31/99	1.7
G52094	8/31/99	0.35
Before Re-excavating Samples that Exceeded the Criteria ⁵	Mean ⁵	21.5
	Standard Deviation ⁵	44.3
	95% UCL ⁵	39.20

Notes:

¹ Sample IDs G52071 through G52079 were biased samples.

² Sample IDs G52080 through G52094 were unbiased samples.

³ mg/kg = milligrams per kilogram.

⁴ The area around sample G52092 was re-excavated and verification samples G52092A through G52092F were collected in March and April 2009 around the approximate coordinates of G52092, with all sample results non-detect for PCBs.

⁵ One half the detection limit was used in the calculation of the arithmetic mean, standard deviation, and 95% UCL of all results shown.

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Table 6-7 -- Summary of MDEQ PCB Soil Verification Sampling Results for Mill Lagoons 1, 2, and 3

Sample ID	Sample Date	Total PCB (mg/kg) ¹
ML SW N-1	8/3/99	280
ML SW N-2	8/3/99	13
ML SW N-3	8/3/99	2.9
ML L-1-4	8/3/99	2.5
ML SW N-5	8/3/99	1.3
ML OF-6	8/3/99	16
ML OF-7	8/3/99	28
ML FP-8	8/3/99	7
ML L-1-9	8/3/99	0.4
ML L-2-10	8/3/99	0.076
ML L-3-11	8/3/99	1.6
ML L-3-12	8/3/99	17
ML FP-13	8/3/99	41
ML L-3-14	8/3/99	2.2
ML SW-E-15	8/3/99	2.4
ML SW-E-16	8/3/99	<0.025
ML SW-E-17	8/3/99	19
Before Re-excavating Samples that Exceeded the Criteria ³	Mean ²	22
	Standard Deviation ²	62
	95% UCL ²	49.00

Notes:

¹ mg/kg = milligrams per kilogram.

² One half the detection limit was used in the calculation of the mean, standard deviation, and 95% UCL.

³ Calculation of the arithmetic mean, standard deviation, and 95% UCL used all sample results shown.

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Table 6-8 -- Summary of Turbidity Monitoring at the Mill Lagoons

Date	Location ^{1,2}	Total Water Depth (ft) ³	Turbidity (NTU)	% Difference ⁴
7/14/99	D	3	20	0
7/14/99	U	4	20	
7/15/99	D	3	18	0
7/15/99	U	4	18	
7/16/99	D	3	18	0
7/16/99	U	4	18	
7/17/99	D	3	18	6
7/17/99	U	4	17	
7/30/99	D	4	18	-5
7/30/99	U	4	19	
8/2/99	D	4	20	5
8/2/99	U	4	19	

Notes:

1. ft = feet.

2. NTU = Nephelometric Turbidity Units.

¹ U = Monitoring was conducted 100 feet upstream of remedial activities.

² D = Monitoring was conducted 100 feet downstream of remedial activities.

³ Monitoring was conducted at mid-depth approximately 25 feet from the riverbank.

⁴ % Difference = Percent difference between the upstream and downstream turbidity results.

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Table 8-1 -- Landfill Gas Monitoring Results Collected at KHL OU

Sample Location	Date	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Balance Nitrogen (%)
GW-1	4/28/03	46.3	42.9	1.9	8.9
GW-2	4/28/03	47.2	29.5	4	19.3
GW-3	4/28/03	74.1	19.1	0.6	6.3
GW-4	4/28/03	47.1	39.9	2.6	10.4
BH-2	4/27/03	52.3	46.8	0	0.9
BH-4	4/28/03	17.8	8.8	9.8	63.6
BH-5	4/27/03	2.8	5.2	15.2	76.8
BH-8	4/28/03	55.4	43	0	1.6
BH-9	4/29/03	26.6	33.2	2.2	38
BH-10	4/27/03	0	0.7	18.6	80.7
BH-11	4/28/03	0.3	4.3	13.3	82.1
BH-12	4/28/03	0	0.3	20	79.7
BH-13	4/28/03	0	1.3	19.3	79.4
BH-14	4/28/03	0	1.9	17.7	80.4
BH-15	4/28/03	9	4.3	9.7	77
BH-16	4/28/03	0	1.4	18.7	79.9
BH-17	4/28/03	0	0	20.5	79.5
BH-18	4/28/03	1.3	0.7	19.7	78.3
GW-1	8/14/03	49.6	43.7	1	5.7
GW-2	8/14/03	59.2	35.2	0.9	4.7
GW-3	8/14/03	48.6	30	1.6	19.8
GW-4	8/14/03	41.4	43	0.2	15.4
BH-105	8/14/03	46.8	43.6	0.8	8.8
BH-106	8/14/03	4.1	16	2.1	77.8
BH-107	8/14/03	29.6	27.9	2.9	39.6
BH-108	8/14/03	1.8	11	10.6	76.6
BH-109	8/14/03	3.6	3.2	15.3	77.9
BH-110	8/14/03	0	1.1	18.9	80
BH-111	8/14/03	0	9.3	6.6	84.1
BH-112	8/14/03	27.6	29.6	0.9	41.9
BH-113	8/14/03	31	26.2	3.7	39.1
BH-114	8/14/03	0	1.1	18.6	80.3
BH-115	8/15/03	36.2	25.9	1.9	36
BH-116	8/14/03	0	5.1	11.4	83.5
BH-117	8/14/03	0	1.6	17.3	81.1
BH-118	8/14/03	31.2	34.3	1.5	33
BH-119	8/14/03	33.5	26.5	4.4	35.6
BH-120	8/14/03	3.8	7.2	14.4	74.6
BH-121	8/14/03	0	0.1	19	80.9
BH-122	8/14/03	0.6	0.8	18.9	79.7
GW-1	11/12/03	56.9	42.4	0.5	0.2
GW-2	11/12/03	65.9	33.4	0.5	0.2
GW-3	11/12/03	68.7	28.1	3.1	0.1
GW-4	11/12/03	59.2	34	6.7	0.1
V-1	11/12/03	72.2	27.2	0.5	0.1
V-2	11/12/03	51.9	28.7	4.5	14.9
V-3	11/12/03	66.4	32.9	0.6	0.1
BH-202	11/12/03	57.5	39.7	2.6	0.2
BH-203	11/12/03	0.2	0.2	20.1	79.5
BH-204	11/12/03	41.9	13.3	11	33.8
BH-205	11/12/03	0.1	0	20.7	79.2
BH-206	11/12/03	1.4	3.3	8.6	86.7
BH-207	11/12/03	12.2	11.8	8.7	67.3
BH-208	11/12/03	66	29.2	2.3	2.5
BH-209	11/12/03	24.4	8.5	1.9	65.2
BH-210	11/12/03	0.1	3	16.7	80.2
BH-211	11/12/03	28.8	5.6	13.2	52.4
BH-212	11/12/03	16.6	9.2	2.2	72
BH-213	11/13/03	15.5	4.8	15.5	64.2
BH-214	11/12/03	0.5	1.4	18.1	80
BH-215	11/12/03	0.1	2.1	17.4	80.4
BH-216	11/12/03	0	0	20.9	79.1
BH-217	11/12/03	0	0.8	20.6	78.6
BH-218	11/12/03	0	1.2	19.8	79
BH-219	11/12/03	0	0	21.1	78.9
BH-220	11/12/03	0	0	20.8	79.2
BH-221	11/12/03	0.1	5.7	8.5	85.7
BH-222	11/12/03	0	1.5	17.9	80.6
BH-223	11/12/03	0	1.2	19.4	79.4

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Table 8-1 -- Landfill Gas Monitoring Results Collected at KHL OU

Sample Location	Date	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Balance Nitrogen (%)
BH-230	11/12/03	65.6	23.8	0.7	9.9
BH-231	11/12/03	0.5	0.9	20.5	78.1
BH-232	11/12/03	57.7	30.1	3.2	9
BH-233	11/12/03	0.6	0.1	18.5	80.8
BH-234	11/12/03	0.1	0.9	19.8	79.2
GW-1	12/8/03	57.3	42.1	0.4	0.2
GW-2	12/8/03	65.4	32.0	0.7	1.9
GW-3	12/8/03	65.9	14.6	0.8	18.7
GW-4	12/8/03	63.0	36.1	0.8	0.1
BH-301	12/8/03	55.6	26.3	4.1	14.0
BH-302	12/8/03	6.4	2.1	16.7	74.8
BH-303	12/8/03	9.7	6.7	14.5	69.1
BH-304	12/8/03	4.2	6.9	9.3	79.6
BH-305	12/8/03	60.3	33.4	1.6	4.7
BH-306	12/9/03	5.5	2.8	14.7	77.0
BH-307	12/8/03	2.4	1.6	17.3	78.7
BH-312	12/8/03	0	0.5	20.3	79.2
BH-313	12/8/03	31.7	12.6	8.2	47.5
BH-314	12/8/03	0	1.8	17.7	80.5
BH-315	12/9/03	2.9	4.4	12.3	80.4
BH-316	12/8/03	0	0.1	20.4	79.5
BH-317	12/8/03	0	4.2	15.2	80.6
BH-318	12/8/03	0	0.3	19.0	80.7
GW-1	2/24/04	21.3	17.8	10.1	50.8
GW-2	2/24/04	34.9	24	6.4	34.7
GW-3	2/24/04	0.1	0	19.5	80.4
GW-3	2/24/04	0	0	20.1	79.9
GW-4	2/24/04	8	6.5	16.1	69.4
GW-4	2/24/04	0	0	19.2	80.8
V-1	2/24/04	0	0	20.1	79.9
V-2	2/24/04	13.5	7.3	16	63.2
V-3	2/24/04	39	20.3	10.1	30.6
BH-10	2/24/04	19.4	12.1	16.6	51.9
BH-105	2/24/04	19.1	8.1	9.9	62.9
BH-106	2/24/04	3.1	1.3	17.8	77.8
BH-107	2/24/04	15.3	12.4	9.3	63
BH-108	2/24/04	2.1	1.8	16.4	79.7
BH-110	2/24/04	15.2	11.7	4.9	68.2
BH-111	2/24/04	7.6	5	11.1	76.3
BH-112	2/24/04	0.6	2.2	18.4	78.8
BH-113	2/24/04	0	2.3	15.9	81.8
BH-114	2/24/04	0	0.5	18.3	81.2
BH-115	2/24/04	0	0	19.9	80.1
BH-116	2/24/04	0	0.7	16.8	82.5
BH-117	2/24/04	0	0	19.6	80.4
BH-118	2/24/04	0	0.1	19	80.9
BH-119	2/24/04	20.6	7.7	10	61.7
BH-120	2/24/04	2.4	7	13	77.6
BH-126	2/24/04	33.1	16.5	14.3	36.1
BH-127	2/24/04	19.5	10.8	13.9	55.8
BH-128	2/24/04	0	0	19.9	80.1
BH-129	2/24/04	42.3	26.2	15.7	15.8
BH-130	2/24/04	1.3	0.6	19.2	78.9
BH-131	2/24/04	54.9	32.3	12.6	0.2
BH-132	2/24/04	0.8	0.4	18.3	80.5
BH-133	2/24/04	0	0.7	19.5	79.8
GW-1	5/20/04	51.3	32.3	0.1	16.3
GW-2	5/20/04	62.0	37.3	0.5	0.2
GW-3	5/20/04	69.2	30.2	0.4	0.2
GW-4	5/20/04	54.7	45.1	0.1	0.1
V-1	5/20/04	55.3	22.9	6.2	15.6
V-2	5/20/04	54.0	30.0	4.3	11.7
V-3	5/20/04	59.3	40.2	0.3	0.2
BH-208	5/20/04	0.4	1.6	19.9	78.1
BH-209	5/20/04	0.2	0.5	19.5	79.8
BH-210	5/20/04	14.1	12.1	5.2	68.6
BH-211	5/20/04	0.1	2.8	18.1	79.0
BH-212	5/20/04	28.3	13.5	3.8	54.4
BH-213	5/20/04	0.2	2.7	16.5	80.6

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Table 8-1 -- Landfill Gas Monitoring Results Collected at KHL OU

Sample Location	Date	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Balance Nitrogen (%)
BH-214	5/20/04	0.1	1.9	18.5	79.5
BH-215	5/20/04	67.9	21.9	1.8	8.4
BH-216	5/21/04	0	1.7	19.0	79.3
BH-217	5/21/04	0	3.5	15.7	80.8
BH-218	5/21/04	24.9	23.8	4.6	46.7
BH-219	5/21/04	8.8	10.2	10.9	70.1
BH-220	5/21/04	0.2	0.7	20.4	78.7
BH-221	5/21/04	10.4	7.9	7.3	74.4
BH-222	5/21/04	17.0	8.9	5.0	69.1
BH-223	5/21/04	0	0.1	21.1	78.8
BH-224	5/21/04	0	7.1	9.5	83.4
BH-225	5/21/04	0	1.9	19.4	78.7
BH-226	5/21/04	0	2.0	17.1	80.9
BH-227	5/21/04	0	1.0	20.1	78.9
BH-228	5/21/04	15.8	11.7	11.7	60.8
BH-229	5/21/04	7.3	9.4	8.0	75.3
BH-230	5/21/04	2.0	2.4	16.4	79.3
BH-231	5/21/04	44.8	40.2	1.9	13.1
BH-232	5/21/04	1.3	2.1	16.0	80.6
BH-233	5/21/04	0	0.1	21.2	78.7
BH-234	5/21/04	45.5	36.8	2.2	15.5
BH-235	5/21/04	8.8	3.3	17.7	70.2
BH-236	5/21/04	2.1	1.0	17.6	79.3
BH-237	5/21/04	0.5	1.5	18.6	79.4
GW-1	9/29/04	41.9	35.4	4.2	18.5
GW-2	9/29/04	37.8	24.9	7.7	29.6
GW-3	9/29/04	36.2	25.7	5.4	32.7
GW-4	9/29/04	35.7	32.9	5.3	26.1
V-1-1	9/29/04	27.4	22.2	10.4	40
V-2-1	9/29/04	44.1	19.4	7.2	29.3
V-2-2	9/29/04	33.7	20.4	9.7	36.2
V-4-1	9/29/04	0	0.4	20.6	79
V-4-2	9/29/04	0	0.3	20.6	79.1
V-4-3	9/29/04	0	0	20.7	79.3
BH-101	9/29/04	43.7	39.6	2.5	14.2
BH-102	9/29/04	34.7	38.3	1.1	25.9
BH-103	9/29/04	16.9	31.9	0.8	50.4
BH-104	9/29/04	11.1	26.7	2.9	59.3
BH-105	9/29/04	11.1	27.3	0.9	60.7
BH-106	9/29/04	42.1	21.3	8.2	28.4
BH-107	9/29/04	1.3	1.4	18	79.3
BH-108	9/29/04	43.4	28.9	1	26.7
BH-109	9/29/04	26.2	9.4	2.2	62.2
BH-110	9/29/04	1.5	9.8	7.1	81.6
BH-111	9/29/04	0	6.8	12.9	80.3
BH-112	9/29/04	1.4	11.2	3.6	83.8
BH-113	9/29/04	0.5	2.6	17.1	79.8
BH-114	9/29/04	25.4	11.2	2.4	61
BH-201	9/29/04	46.7	13.7	2.8	36.8
BH-202	9/29/04	42.2	17.7	7.9	32.2
BH-203	9/29/04	0	1.4	19.4	79.2
GW-1	12/16/04	56.6	43.4	0	0
GW-2	12/16/04	55.3	33.9	0	10.8
GW-3	12/16/04	40.5	14.7	0.3	44.5
GW-4	12/16/04	59.4	37.0	1.1	2.5
V-1-1	12/16/04	60.7	38.9	0.4	0
V-2-1	12/16/04	35.9	16.7	6.3	41.1
V-2-2	12/16/04	46.8	22.4	6.8	24.0
V-4-1	12/16/04	3.9	2.2	19.0	74.9
V-4-2	12/16/04	0	0	20.4	79.6
V-4-3	12/16/04	0	0	20.4	79.6
BH-101	12/16/04	1.4	0.9	19.9	77.8
BH-102	12/16/04	57.6	7.2	1.4	33.8
BH-103	12/16/04	0	1.9	18.3	79.8
BH-104	12/16/04	0	1.5	18.0	80.5
BH-105	12/16/04	0.2	0.5	18.4	80.9
BH-106	12/16/04	0	0.7	18.5	80.8
BH-107	12/16/04	2.5	0.9	17.8	78.8
BH-201	12/16/04	0	1.7	16.1	82.2

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Table 8-1 -- Landfill Gas Monitoring Results Collected at KHL OU

Sample Location	Date	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Balance Nitrogen (%)
BH-202	12/16/04	0.1	0.4	19.4	80.1
BH-203	12/16/04	12.0	4.4	12.6	71.0
BH-204	12/16/04	56.1	13.5	5.3	25.1
BH-205	12/16/04	5.6	0.8	15.8	77.8
BH-301	12/16/04	0	9.7	8.5	81.8
BH-401	12/16/04	64.7	34.5	0.5	0.3
BH-402	12/16/04	0.1	0.3	17.8	81.8
GW-1	3/15/05	52.6	42.2	1.3	3.9
GW-2	3/15/05	0.2	1.6	18.8	79.4
GW-3	3/15/05	0	0	20.8	79.2
GW-4	3/15/05	58.3	38.1	1.5	2.1
V-1-1	3/15/05	20.4	11.2	15.2	53.2
V-2-1	3/15/05	0	0	20.8	79.2
V-2-2	3/15/05	5.3	1.8	19.3	73.6
V-4-1	3/15/05	0	0.1	19.6	80.3
V-4-2	3/15/05	2.7	1.6	19.0	76.7
V-4-3	3/15/05	2.5	2.2	19.1	76.2
BH-101	3/15/05	1.4	0.4	20.3	77.9
BH-104	3/15/05	0.6	0.4	20.1	78.9
BH-105	3/15/05	0	2.3	13.4	84.3
BH-107	3/15/05	3.4	0.3	19.1	77.2
GW-1	5/26/05	54.5	44.7	0.6	0.2
GW-2	5/26/05	58.5	39.5	0.0	2.0
GW-3	5/26/05	58.7	30.4	0.2	10.7
GW-4	5/26/05	42.2	38.4	0.4	19.0
GW-5	5/26/05	0.8	0.4	18.1	80.7
GW-6	5/26/05	0.7	1.3	19.7	78.3
GW-7	5/26/05	0.2	1.6	16.9	81.3
GW-8	5/26/05	0.0	10.7	2.8	86.5
GW-9	5/26/05	0.2	3.0	16.0	80.8
V-1-1	5/26/05	12.2	7.9	17.1	62.8
V-2-1	5/26/05	14.0	5.9	15.9	64.2
V-2-2	5/26/05	23.3	13.0	12.6	51.1
V-3-1	5/26/05	5.2	2.0	18.3	74.5
V-4-1	5/26/05	3.6	4.1	16.0	76.3
V-4-2	5/26/05	2.3	2.1	19.6	76.0
V-4-3	5/26/05	1.6	2.4	18.7	77.3
BH-101	5/26/05	1.2	2.4	18.3	78.1
BH-102	5/26/05	0.6	1.1	15.4	82.9
BH-103	5/26/05	0.0	0.9	19.3	79.8
BH-201	5/26/05	10.9	6.4	15.4	67.3
BH-202	5/26/05	0.3	1.0	18.8	79.9
BH-203	5/26/05	0.4	1.2	12.8	85.6
BH-301	5/26/05	3.0	6.1	12.7	78.2
BH-302	5/26/05	4.3	11.0	73.9	10.8
BH-303	5/26/05	3.8	9.4	11.7	75.1
BH-304	5/26/05	0.0	0.4	20.0	79.6
GW-1	8/18/05	51.0	44.8	0.3	3.9
GW-2	8/18/05	53.3	36.9	1.5	8.3
GW-3	8/18/05	52.6	33.9	0.0	13.5
GW-4	8/18/05	48.2	45.1	0.0	6.7
GW-5	8/18/05	40.0	13.8	0.3	45.9
GW-6	8/18/05	51.9	43.7	0.0	4.4
GW-7	8/18/05	0.0	3.8	16.5	79.7
GW-8	8/18/05	5.8	10.1	0.2	83.9
GW-9	8/18/05	0.0	7.2	12.5	80.3
GW-10	8/18/05	0.0	12.9	4.8	82.3
GW-11	8/18/05	0.0	18.9	2.7	78.4
V-1-1	8/18/05	52.3	47.6	0.0	0.1
V-2-2	8/18/05	39.5	26.8	6.5	27.2
V-3-1	8/18/05	14.9	16.4	8.3	60.4
V-4-1	8/18/05	14.1	18.0	8.1	59.8
V-4-2	8/18/05	20.6	24.1	6.0	49.3
V-4-3	8/18/05	17.5	19.9	9.2	53.4
BH-101	8/18/05	59.9	20.8	0.1	19.2
BH-102	8/18/05	44.4	40.2	0.7	14.7
BH-103	8/18/05	0.0	3.1	17.9	79.0
BH-104	8/18/05	12.3	4.0	14.3	69.4
BH-105	8/18/05	0.0	2.6	18.1	79.3

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Table 8-1 -- Landfill Gas Monitoring Results Collected at KHL OU

Sample Location	Date	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Balance Nitrogen (%)
BH-106	8/18/05	0.0	1.0	20.6	78.4
BH-201	8/18/05	22.0	21.8	0.5	55.7
BH-202	8/18/05	0.0	12.2	9.0	78.8
BH-203	8/18/05	22.4	9.7	12.9	55.0
BH-204	8/18/05	26.7	18.9	2.9	51.5
BH-205	8/18/05	0.8	2.2	0.7	96.3
BH-301	8/18/05	16.8	23.1	0.7	59.4
BH-302	8/18/05	0.0	10.9	7.1	82.0
BH-303	8/18/05	25.3	23.0	0.5	51.2
BH-304	8/18/05	11.4	15.0	3.1	70.5
BH-305	8/18/05	0.1	11.3	9.4	79.2
BH-306	8/18/05	0.0	6.4	16.1	77.5
BH-307	8/18/05	0.0	5.5	17.5	77.0
BH-701	8/18/05	0.0	3.1	18.3	78.6
BH-801	8/18/05	0.0	1.2	20.4	78.4
BH-802	8/18/05	0.0	1.9	19.8	78.3
BH-100	8/18/05	0.0	7.4	12.1	80.5
BH-100	8/18/05	0.0	0.5	20.5	79.0
BH-110	8/18/05	0.0	3.6	18.2	78.2
BH-110	8/18/05	0.0	10.2	11.6	78.2
GW-1	11/8/05	53.2	45.3	0.2	1.3
GW-2	11/8/05	41.8	30.6	3.2	24.4
GW-3	11/8/05	6.2	8.0	14.5	71.3
GW-4	11/8/05	48.8	39.0	0.4	11.8
GW-5	11/8/05	24.5	12.6	0.2	62.7
GW-6	11/8/05	53.6	39.4	0.4	6.6
GW-7	11/8/05	0.0	3.2	16.8	80.0
GW-8	11/8/05	0.0	13.4	0.6	86.0
GW-9	11/8/05	0.0	3.8	15.4	80.8
GW-10	11/8/05	0.0	9.5	7.0	83.5
GW-11	11/8/05	0.0	12.1	6.0	81.9
BH-101	11/8/05	27.0	13.8	5.3	53.9
BH-102	11/8/05	26.0	32.5	0.3	41.2
BH-103	11/8/05	0.0	2.1	17.4	80.5
BH-104	11/8/05	0.0	8.1	7.6	84.3
BH-201	11/8/05	22.5	23.5	0.4	53.6
BH-202	11/8/05	0.0	6.2	13.8	80.0
BH-301	11/8/05	0.0	18.4	1.7	79.9
BH-601	11/8/05	5.4	12.2	0.4	82.0
BH-602	11/8/05	0.0	3.5	15.8	80.7
V-1-1	11/8/05	54.2	45.2	0.6	0.0
V-2-1	11/8/05	10.0	6.9	14.5	68.6
V-2-2	11/8/05	47.4	28.1	5.8	18.7
V-3-1	11/8/05	5.6	2.0	18.9	73.5
V-4-1	11/8/05	1.0	2.9	17.7	78.4
V-4-2	11/8/05	0.0	0.0	20.5	79.5
V-4-3	11/8/05	3.3	7.0	13.8	75.9
GW-1	2/8/06	56.0	43.7	0.3	0.0
GW-2	2/8/06	41.0	24.9	2.5	31.6
GW-3	2/8/06	0.8	4.8	10.3	84.1
GW-4	2/8/06	63.1	36.2	0.7	0.0
GW-5	2/8/06	36.7	4.0	1.0	58.3
GW-6	2/8/06	83.7	14.3	0.0	2.0
GW-7	2/8/06	0.0	1.5	17.7	80.8
GW-8	2/8/06	20.0	5.5	1.9	72.6
GW-9	2/8/06	0.0	4.3	15.1	80.6
GW-10	2/8/06	0.0	7.4	1.4	91.2
GW-11	2/8/06	0.0	1.2	19.0	79.8
BH-201 ⁴	2/8/06	6.1	4.2	13.3	76.4
BH-501	2/8/06	0.1	1.0	16.1	82.8
BH-502	2/8/06	0.0	0.2	17.9	81.9
BH-801	2/8/06	0.0	4.4	15.5	80.1
BH-430	2/8/06	32.9	18.1	3.5	45.5
BH-430	2/8/06	34.2	22.9	0.0	42.9
BH-430	2/8/06	7.6	7.9	11.9	72.6
BH-430	2/8/06	0.7	0.4	17.3	81.6
V-1-1	2/8/06	56.8	39.6	3.6	0.0
V-2-1	2/8/06	16.2	6.5	15.8	61.5
V-2-2	2/8/06	29.6	10.5	13.5	46.4

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Table 8-1 -- Landfill Gas Monitoring Results Collected at KHL OU

Sample Location	Date	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Balance Nitrogen (%)
V-3-1	2/8/06	2.8	0.7	20.5	76.0
V-4-1	2/8/06	0.5	0.5	19.0	80.0
V-4-2	2/8/06	0.0	0.1	19.0	80.9
V-4-3	2/8/06	22.1	11.5	11.1	55.3
GW-1	5/8/06	52.8	47.2	0.0	0.0
GW-2	5/8/06	58.2	40.4	0.0	1.4
GW-3	5/8/06	66.2	28.0	0.0	5.8
GW-4	5/8/06	0.0	46.3	0.0	53.7
GW-5	5/8/06	31.6	4.5	0.0	63.9
GW-6	5/8/06	61.8	29.4	0.0	8.8
GW-7	5/8/06	0.0	1.5	16.1	82.4
GW-8	5/8/06	15.8	6.3	0.0	77.9
GW-9	5/8/06	0.0	7.4	6.6	86.0
GW-10	5/8/06	0.0	0.3	18.3	81.4
GW-11	5/8/06	0.0	10.1	3.8	86.1
GW-12	5/8/06	0.0	10.4	6.1	83.5
BH-201	5/8/06	49.5	21.2	0.0	29.3
BH-202	5/8/06	0.1	4.2	12.1	83.6
BH-301	5/8/06	15.5	12.0	6.5	66.0
BH-302	5/8/06	25.4	18.8	0.0	55.8
BH-303	5/8/06	0.0	0.4	18.3	81.3
BH-304	5/8/06	13.7	7.9	5.9	72.5
BH-305	5/8/06	4.7	3.8	9.9	81.6
BH-306 ⁵	5/8/06	--	--	--	--
BH-307	5/8/06	9.0	11.1	0.0	79.9
BH-308 ⁵	5/8/06	--	--	--	--
BH-309	5/8/06	0.0	0.4	18.2	81.4
BH-310	5/8/06	38.1	7.5	0.0	54.4
BH-311	5/8/06	0.0	0.4	18.3	81.3
BH-312	5/8/06	0.8	6.8	6.2	86.2
BH-501	5/8/06	0.0	0.9	17.2	81.9
BH-502	5/8/06	0.0	4.1	7.4	88.5
BH-601	5/8/06	51.1	8.6	0.0	40.3
BH-801	5/8/06	3.4	12.8	0.0	83.8
BH-802	5/8/06	0.0	0.8	16.7	82.5
V-1-1	5/8/06	52.3	46.7	0.0	1.0
V-2-1	5/8/06	44.0	29.7	0.0	26.3
V-2-2	5/8/06	53.5	23.9	5.5	17.1
V-3-1	5/8/06	26.4	9.4	12.2	52.0
V-4-1	5/8/06	0.0	0.0	20.3	79.7
V-4-2	5/8/06	0.0	0.0	20.5	79.5
V-4-3	5/8/06	0.0	0.1	20.1	79.8
V-4-4	5/8/06	0.0	0.0	20.2	79.8
V-4-5	5/8/06	0.0	0.8	19.0	80.2
V-4-6	5/8/06	0.0	0.0	20.0	80.0
GW-1	9/7/06	53.6	46.4	0.0	0.0
GW-2	9/7/06	42.0	30.2	5.7	22.1
GW-3	9/7/06	49.9	26.5	3.2	20.4
GW-4	9/7/06	50.4	44.9	0.9	3.8
GW-5	9/7/06	46.1	8.7	0.0	45.2
GW-6	9/7/06	60.7	38.2	0.0	1.1
GW-7	9/7/06	0.0	5.0	14.8	80.2
GW-8	9/7/06	34.6	5.8	0.0	59.6
GW-9	9/7/06	1.4	13.5	0.1	85.0
GW-10	9/7/06	0.0	0.6	20.2	79.2
GW-11	9/7/06	0.3	8.0	7.1	84.6
GW-12	9/7/06	0.0	0.1	20.8	79.1
BH-201	9/7/06	29.7	14.1	9.5	46.7
BH-202	9/7/06	0.0	1.3	19.8	78.9
BH-301	9/7/06	0.8	2.7	18.1	78.4
BH-302	9/7/06	3.8	3.7	17.3	75.2
BH-303	9/7/06	12.3	16.1	3.7	67.9
BH-304	9/7/06	4.0	1.5	19.0	75.5
BH-305	9/7/06	0.0	2.4	19.1	78.5
BH-501	9/7/06	0.0	2.3	18.2	79.5
BH-502	9/7/06	1.0	2.8	16.0	80.2
BH-601	9/7/06	0.0	0.2	20.9	78.9
BH-801	9/7/06	0.0	3.0	17.8	79.2
BH-802	9/7/06	4.4	3.1	13.7	78.8

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Table 8-1 -- Landfill Gas Monitoring Results Collected at KHL OU

Sample Location	Date	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Balance Nitrogen (%)
V-1-1	9/7/06	30.7	28.6	8.7	32.0
V-2-1	9/7/06	25.5	12.6	12.6	49.3
V-2-2	9/7/06	18.6	11.3	14.1	56.0
V-3-1	9/7/06	2.6	1.5	20.1	75.8
V-4-1	9/7/06	0.0	0.1	20.8	79.1
V-4-2	9/7/06	0.0	0.2	2.9	96.9
V-4-3	9/7/06	0.0	0.0	20.8	79.2
V-4-4	9/7/06	0.0	0.0	20.9	79.1
V-4-5	9/7/06	0.0	0.1	20.8	79.1
V-4-6	9/7/06	0.0	0.1	20.9	79.0
GW-1	11/8/06	54.9	45.1	0.0	0.0
GW-2	11/8/06	54.2	35.8	0.0	10.0
GW-3	11/8/06	63.1	25.5	0.0	11.4
GW-4	11/8/06	57.4	41.6	0.0	1.0
GW-5	11/8/06	56.6	4.2	0.0	39.2
GW-6	11/8/06	72.6	23.5	0.0	3.9
GW-7	11/8/06	0.0	0.2	20.4	79.4
GW-8	11/8/06	46.0	5.3	0.0	48.7
GW-9	11/8/06	25.4	8.9	0.0	65.7
GW-10	11/8/06	0.4	9.3	0.0	90.3
GW-11	11/8/06	0.0	8.4	5.2	86.4
GW-12	11/8/06	0.0	4.4	15.2	80.4
BH-201	11/8/06	0.2	2.4	15.5	81.9
BH-301	11/8/06	0.0	0.0	19.8	80.2
BH-501	11/8/06	3.5	1.7	11.3	83.5
BH-502	11/8/06	0.0	2.2	16.8	81.0
BH-801	11/8/06	17.4	3.5	6.9	72.2
BH-802	11/8/06	0.0	0.8	20.1	79.1
BH-901	11/8/06	0.0	1.3	19.5	79.2
V-1-1	11/8/06	54.9	43.8	0.0	1.3
V-2-1	11/8/06	53.1	22.1	2.3	22.5
V-2-2	11/8/06	51.4	27.2	0.0	21.4
V-3-1	11/8/06	14.4	6.1	15.2	64.3
V-4-1	11/8/06	17.4	15.2	9.9	57.5
V-4-2	11/8/06	0.0	0.0	22.1	77.9
V-4-3	11/8/06	5.8	8.3	13.1	72.8
V-4-4	11/8/06	0.0	0.0	21.7	78.3
V-4-5	11/8/06	0.0	0.1	21.7	78.2
V-4-6	11/8/06	0.0	0.0	21.8	78.2
GW-1	2/8/07	54.9	44.5	0.0	0.6
GW-2	2/8/07	40.5	27.9	0.8	30.8
GW-3	2/8/07	34.8	9.6	2.8	52.8
GW-4 ⁶	2/8/07	60.5	39.5	0.0	0.0
GW-5	2/8/07	49.9	3.3	0.0	46.8
GW-6 ⁷	2/8/07	17.6	2.8	16.2	63.4
GW-7	2/8/07	0.0	0.1	20.8	79.1
GW-8	2/8/07	0.9	2.5	14.0	82.6
GW-9	2/8/07	0.0	0.7	19.9	79.4
GW-10	2/8/07	0.0	7.3	1.4	91.3
GW-11	2/8/07	0.0	0.2	20.7	79.1
GW-12	2/8/07	0.0	0.8	19.6	79.6
BH-201	2/8/07	0.0	0.1	21.1	78.8
BH-501	2/8/07	0.0	0.1	20.6	79.3
BH-502	2/8/07	0.0	0.1	20.6	79.3
V-1-1	2/8/07	23.5	17.7	11.8	47.0
V-2-1	2/8/07	6.4	3.3	18.5	71.8
V-2-2	2/8/07	18.6	8.5	15.1	57.8
V-3-1	2/8/07	5.9	1.7	19.4	73.0
V-4-1	2/8/07	0.0	0.0	20.8	79.2
V-4-2	2/8/07	0.0	0.0	20.8	79.2
V-4-3	2/8/07	0.1	0.2	20.0	79.7
V-4-4	2/8/07	0.0	0.1	20.8	79.1
V-4-5	2/8/07	0.0	0.0	20.8	79.2
V-4-6	2/8/07	0.0	0.0	20.8	79.2
GW-1	5/10/07	52.8	46.8	0.2	0.2
GW-2	5/10/07	61.5	38.0	0.2	0.3
GW-3	5/10/07	46.8	20.0	20.1	13.1
GW-4	5/10/07	50.2	44.6	0.4	4.8
GW-5	5/10/07	26.2	6.4	1.6	65.8

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Table 8-1 -- Landfill Gas Monitoring Results Collected at KHL OU

Sample Location	Date	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Balance Nitrogen (%)
GW-6	5/10/07	64.5	24.9	0.4	10.2
GW-7	5/10/07	0.0	1.6	18.6	79.8
GW-8	5/10/07	17.0	7.8	0.4	74.8
GW-9	5/10/07	0.0	14.4	0.9	84.7
GW-10	5/10/07	0.0	1.1	18.9	80.0
GW-11	5/10/07	0.0	4.1	13.3	82.6
GW-12	5/10/07	0.0	3.0	15.0	82.0
BH-201	5/10/07	0.0	0.7	20.0	79.3
BH-301	5/10/07	0.0	0.5	20.4	79.1
BH-501	5/10/07	0.0	0.8	20.2	79.0
BH-502	5/10/07	0.0	2.4	17.1	80.5
BH-801	5/10/07	0.0	1.8	19.0	79.2
BH-802	5/10/07	0.0	0.4	20.6	79.0
V-1-1	5/10/07	57.0	42.4	0.1	0.5
V-2-1	5/10/07	35.0	15.0	9.6	40.4
V-2-2	5/10/07	33.7	18.4	8.2	39.7
V-3-1	5/10/07	4.0	1.8	19.2	75.0
V-4-1	5/10/07	14.6	19.7	6.4	59.3
V-4-2	5/10/07	7.0	4.1	18.2	70.7
V-4-3	5/10/07	0.3	2.0	16.0	81.7
V-4-4	5/10/07	0.0	0.4	20.7	78.9
V-4-5	5/10/07	0.0	2.8	17.2	80.0
V-4-6	5/10/07	0.0	5.2	16.1	78.7
GW-1	8/8/07	50.5	45.0	0.0	4.5
GW-2	8/8/07	41.5	36.6	0.0	21.9
GW-3	8/8/07	33.0	24.9	5.5	36.6
GW-4	8/8/07	40.7	41.5	0.0	17.8
GW-5	8/8/07	8.6	11.2	0.6	79.6
GW-6	8/8/07	4.6	6.0	14.0	75.4
GW-7	8/8/07	0.0	2.2	15.7	82.1
GW-8	8/8/07	0.0	7.2	11.1	81.7
GW-9	8/8/07	0.0	5.4	12.4	82.2
GW-10	8/8/07	0.0	3.4	13.6	83.0
GW-11	8/8/07	0.0	12.0	6.7	81.3
GW-12	8/8/07	0.0	2.9	14.3	82.8
BH-201	8/8/07	0.0	4.0	14.5	81.5
BH-301	8/8/07	4.3	11.1	9.0	75.6
BH-501	8/8/07	0.0	5.0	11.9	83.1
BH-502	8/8/07	0.0	1.4	16.8	81.8
V-1-1	8/8/07	51.8	47.2	0.0	1.0
V-2-1	8/8/07	1.5	0.7	17.4	80.4
V-2-2	8/8/07	41.4	28.0	5.5	25.1
V-3-1	8/8/07	0.7	0.3	18.0	81.0
V-4-1	8/8/07	0.0	0.0	18.3	81.7
V-4-2	8/8/07	0.0	0.3	18.0	81.7
V-4-3	8/8/07	0.0	0.2	18.0	81.8
V-4-4	8/8/07	0.0	0.3	18.0	81.7
V-4-5	8/8/07	0.0	13.4	6.4	80.2
V-4-6	8/8/07	0.0	15.1	4.9	80.0
GW-1	10/31/07	54.1	45.7	0.1	0.1
GW-2	10/31/07	58.9	40.9	0.1	0.1
GW-3	10/31/07	41.6	18.8	2.5	37.1
GW-4	10/31/07	23.3	18.9	11.3	46.5
GW-5	10/31/07	23.6	6.1	0.2	70.1
GW-6	10/31/07	70.6	29.1	0.1	0.2
GW-7	10/31/07	0.0	3.3	16.1	80.6
GW-8	10/31/07	9.4	8.9	0.2	81.5
GW-9	10/31/07	11.5	11.6	0.1	76.8
GW-10	10/31/07	0.0	1.3	17.9	80.8
GW-11	10/31/07	0.0	1.4	18.1	80.5
GW-12	10/31/07	0.0	4.5	15.5	80.0
BH-201	10/31/07	0.0	0.9	19.1	80.0
BH-301	10/31/07	42.7	20.2	3.1	34.0
BH-302	10/31/07	0.0	0.1	20.4	79.5
BH-501	10/31/07	0.0	1.9	17.1	81.0
BH-502	10/31/07	0.0	0.5	19.4	80.1
BH-701	10/31/07	0.0	3.5	16.0	80.5
BH-801	10/31/07	0.0	2.6	14.1	83.3
BH-802	10/31/07	0.0	1.0	19.3	79.7

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Table 8-1 -- Landfill Gas Monitoring Results Collected at KHL OU

Sample Location	Date	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Balance Nitrogen (%)
BH-901	10/31/07	0.0	0.8	18.8	80.4
V-1-1	10/31/07	54.9	45.0	0.1	0.0
V-2-1	10/31/07	67.8	30.2	0.6	1.4
V-2-2	10/31/07	59.3	31.5	1.8	7.4
V-3-1	10/31/07	19.2	8.5	13.7	58.6
V-4-1	10/31/07	0.0	0.0	20.4	79.6
V-4-2	10/31/07	0.0	0.0	20.3	79.7
V-4-3	10/31/07	0.0	0.0	20.4	79.6
V-4-4	10/31/07	0.0	0.0	20.3	79.7
V-4-5	10/31/07	0.0	0.0	20.4	79.6
V-4-6	10/31/07	0.0	0.0	20.4	79.6
GW-1	2/14/08	55.6	44.2	0.2	0.0
GW-2	2/14/08	46.9	31.7	3.1	18.3
GW-3	2/14/08	0.2	0.4	21.6	77.8
GW-4	2/14/08	58.3	40.6	1.1	0.0
GW-5	2/14/08	11.5	5.8	1.8	80.9
GW-6	2/14/08	10.2	4.1	14.1	71.6
GW-7	2/14/08	0.0	0.4	20.7	78.9
GW-8	2/14/08	0.0	1.0	20.2	78.8
GW-9	2/14/08	0.0	1.0	19.4	79.6
GW-10	2/14/08	NA	NA	NA	NA
GW-11	2/14/08	0.0	0.8	20.4	78.8
GW-12	2/14/08	0.2	0.6	17.7	81.5
V-1-1	2/14/08	20.4	18.7	12.9	48.0
V-2-1	2/14/08	18.9	10.7	12.5	57.9
V-2-2	2/14/08	24.8	12.8	14.7	47.7
V-3-1	2/14/08	0.5	0.5	21.6	77.4
V-4-1	2/14/08	0.0	0.1	21.4	78.5
V-4-2	2/14/08	0.2	0.5	20.6	78.7
V-4-3	2/14/08	0.9	1.5	19.9	77.7
V-4-4	2/14/08	0.0	0.1	20.3	79.6
V-4-5	2/14/08	0.0	0.4	20.1	79.5
V-4-6	2/14/08	0.0	0.1	20.2	79.7
GW-1	5/15/08	50.1	42.5	0.0	7.4
GW-2	5/15/08	0.3	0.6	19.3	79.8
GW-3	5/15/08	5.2	5.6	13.6	75.6
GW-4	5/15/08	47.8	37.2	0.0	15.0
GW-5	5/15/08	8.3	4.7	6.1	80.9
GW-6	5/15/08	0.1	20.0	1.3	78.6
GW-7	5/15/08	0.1	1.9	17.5	80.5
GW-8	5/15/08	0.1	2.6	15.2	82.1
GW-9	5/15/08	0.0	6.1	12.4	81.5
GW-10	5/15/08	0.0	7.8	7.3	84.9
GW-11	5/15/08	0.0	8.7	10.1	81.2
GW-12	5/15/08	0.0	6.3	19.3	74.4
V-1-1	5/15/08	54.4	43.8	0.0	1.8
V-1-2	5/15/08	1.1	2.0	18.8	78.1
V-1-3	5/15/08	0.0	0.0	20.1	79.9
V-1-4	5/15/08	0.0	0.2	19.9	79.9
V-1-5	5/15/08	0.1	0.0	20.1	79.8
V-1-6	5/15/08	0.1	0.0	20.2	79.7
V-2-1	5/15/08	1.9	3.6	15.9	78.6
V-2-2	5/15/08	18.1	9.5	13.1	59.3
V-2-10	5/15/08	0.1	0.0	19.8	80.1
V-3-1	5/15/08	3.2	1.2	18.8	76.8
V-4-1	5/15/08	0.0	0.0	20.1	79.9
V-4-2	5/15/08	0.4	1.3	18.9	79.4
V-4-3	5/15/08	0.1	0.8	19.3	79.8
V-4-4	5/15/08	0.0	0.0	20.1	79.9
V-4-5	5/15/08	0.0	0.0	20.1	79.9
V-4-6	5/15/08	0.0	0.0	20.0	80.0
BH-201	8/6/08	0.0	3.4	15.9	80.7
GW-1	8/6/08	45.5	45.9	0.0	8.6
GW-2	8/6/08	34.1	35.2	0.0	30.7
GW-3	8/6/08	0.6	3.5	14.9	81.0
GW-4	8/6/08	39.0	43.6	0.0	17.4
GW-5	8/6/08	0.1	4.7	10.9	84.3
GW-6	8/6/08	0.0	2.2	16.9	80.9
GW-7	8/6/08	0.1	0.4	18.9	80.6

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Table 8-1 -- Landfill Gas Monitoring Results Collected at KHL OU

Sample Location	Date	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Balance Nitrogen (%)
GW-8	8/6/08	0.0	8.4	11.7	79.9
GW-9	8/6/08	0.1	2.8	16.7	80.4
GW-10	8/6/08	0.0	11.6	5.8	82.6
GW-11	8/6/08	0.0	12.0	9.5	78.5
GW-12	8/6/08	0.3	9.2	10.0	80.5
V-1-1	8/6/08	51.4	47.7	0.0	0.9
V-1-2	8/6/08	2.6	13.2	9.1	75.1
V-1-3	8/6/08	0.2	0.3	19.7	79.8
V-1-4	8/6/08	0.4	0.7	19.6	79.3
V-1-5	8/6/08	0.3	0.9	19.3	79.5
V-1-6	8/6/08	2.5	16.3	2.9	78.3
V-2-1	8/6/08	29.7	16.7	8.6	45.0
V-2-2	8/6/08	37.4	22.7	8.5	31.4
V-2-3	8/6/08	0.2	0.1	19.6	80.1
V-2-10	8/6/08	0.6	4.3	15.1	80.0
V-2-18	8/6/08	0.1	0.4	19.6	79.9
V-3-1	8/6/08	3.0	1.2	19.0	76.8
V-4-1	8/6/08	0.0	0.3	19.7	80.0
V-4-2	8/6/08	0.0	0.7	19.3	80.0
V-4-3	8/6/08	0.0	0.2	19.7	80.1
V-4-4	8/6/08	0.3	0.6	16.8	82.3
V-4-5	8/6/08	0.3	0.4	19.7	79.6
V-4-6	8/6/08	0.3	3.7	16.3	79.7
GW-1	11/5/08	55.9	44.1	0.0	0.0
GW-2	11/5/08	60.5	35.1	0.1	4.3
GW-3	11/5/08	49.7	20.5	2.4	27.4
GW-4	11/5/08	56.7	41.1	0.2	2.0
GW-5	11/5/08	0.0	8.0	4.3	87.7
GW-6	11/5/08	0.0	4.5	12.9	82.6
GW-7	11/5/08	0.0	2.6	15.3	82.1
GW-8	11/5/08	0.0	9.2	6.5	84.3
GW-9	11/5/08	0.0	0.5	20.5	79.0
GW-10	11/5/08	0.0	0.4	20.4	79.2
GW-11	11/5/08	0.0	10.5	6.9	82.6
GW-12	11/5/08	0.0	6.1	14.4	79.5
BH-201	11/5/08	0.0	0.7	20.1	79.2
BH-301	11/5/08	0.0	0.6	20.3	79.1
V-1-1	11/5/08	55.8	44.2	0.0	0.0
V-1-2	11/5/08	1.6	4.8	16.1	77.5
V-1-3	11/5/08	0.0	0.1	20.5	79.4
V-1-4	11/5/08	0.0	0.0	20.6	79.4
V-1-5	11/5/08	0.0	0.3	20.3	79.4
V-1-6	11/5/08	0.0	0.1	20.6	79.3
V-2-1	11/5/08	50.9	22.1	5.9	21.1
V-2-2	11/5/08	55.4	28.2	3.3	13.1
V-2-3	11/5/08	0.1	0.2	20.7	79.0
V-2-10	11/5/08	1.0	3.5	16.5	79.0
V-2-18	11/5/08	0.0	0.0	21.0	79.0
V-4-1	11/5/08	3.5	4.5	16.8	75.2
V-4-2	11/5/08	4.2	8.8	12.4	74.6
V-4-3	11/5/08	2.5	6.7	14.0	76.8
V-4-4	11/5/08	0.0	0.0	21.1	78.9
V-4-5	11/5/08	0.0	0.0	21.1	78.9
V-4-6	11/5/08	0.0	0.0	20.8	79.2
GW-1	2/5/09	56.5	39.5	4.0	0.0
GW-2	2/5/09	0.1	0.2	19.4	80.3
GW-3	2/5/09	0.1	0.2	19.7	80.0
GW-4	2/5/09	0.0	0.2	19.0	80.8
GW-5	2/5/09	0.1	4.0	11.3	84.6
GW-6	2/5/09	0.1	0.6	18.4	80.9
GW-7	2/5/09	0.1	0.3	19.5	80.1
GW-8	2/5/09	0.1	4.2	16.2	79.5
GW-9	2/5/09	0.1	1.5	18.4	80.0
GW-10	2/5/09	0.1	0.2	19.7	80.0
GW-11	2/5/09	0.1	0.3	18.4	81.2
GW-12	2/5/09	0.1	0.6	17.6	81.7
V-1-1	2/5/09	36.2	27.0	11.2	25.6
V-1-2	2/5/09	1.2	1.9	19.0	77.9
V-1-3	2/5/09	0.1	0.2	19.6	80.1

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Sample Location	Date	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Balance Nitrogen (%)
V-1-4	2/5/09	0.1	0.2	19.7	80.0
V-1-5	2/5/09	0.1	0.2	19.6	80.1
V-1-6	2/5/09	0.1	0.3	19.6	80.0
V-2-1	2/5/09	13.7	8.5	12.4	65.4
V-2-2	2/5/09	16.4	9.1	13.0	61.5
V-2-3	2/5/09	0.1	0.2	19.4	80.3
V-2-10	2/5/09	0.1	0.2	19.2	80.5
V-2-18	2/5/09	0.1	0.3	18.4	81.2
V-3-1	2/5/09	1.9	0.8	16.5	80.8
V-4-1	2/5/09	3.3	3.1	17.0	76.6
V-4-2	2/5/09	0.9	1.1	17.9	80.1
V-4-3	2/5/09	0.8	1.1	17.8	80.3
V-4-4	2/5/09	0.1	0.2	18.0	81.7
V-4-5	2/5/09	0.1	0.4	16.8	82.7
V-4-6	2/5/09	0.1	1.2	17.4	81.3
GW-1	5/21/09	52.6	46.1	0.4	0.9
GW-2	5/21/09	48.8	36.5	0.4	14.3
GW-3	5/21/09	13.5	6.3	10.6	69.6
GW-4	5/21/09	52.1	46.5	0.5	0.9
GW-5	5/21/09	0.0	7.5	6.8	85.7
GW-6	5/21/09	0.0	3.9	11.1	85.0
GW-7	5/21/09	0.0	1.8	16.7	81.5
GW-8	5/21/09	0.0	6.1	12.0	81.9
GW-9	5/21/09	0.0	2.6	16.6	80.8
GW-10	5/21/09	0.0	7.7	6.9	85.4
GW-11	5/21/09	0.0	14.0	6.3	79.7
GW-12	5/21/09	0.0	2.6	15.4	82.0
BH-201	5/21/09	0.1	0.7	18.5	80.7
BH-301	5/21/09	0.0	0.2	19.2	80.6
V-1-1	5/21/09	52.4	42.8	1.4	3.4
V-1-2	5/21/09	0.0	0.0	19.4	80.6
V-1-3	5/21/09	0.0	0.0	19.4	80.6
V-1-4	5/21/09	0.0	0.0	19.3	80.7
V-1-5	5/21/09	2.1	5.6	14.5	77.8
V-1-6	5/21/09	0.0	0.0	19.1	80.9
V-2-1	5/21/09	28.5	13.1	11.1	47.3
V-2-2	5/21/09	28.0	13.1	11.8	47.1
V-2-3	5/21/09	0.0	0.0	19.3	80.7
V-2-10	5/21/09	0.0	0.0	19.6	80.4
V-2-18	5/21/09	0.0	0.0	19.5	80.5
V-3-1	5/21/09	3.2	0.9	18.8	77.1
V-4-1	5/21/09	1.7	5.9	13.6	78.8
V-4-2	5/21/09	0.0	0.0	19.4	80.6
V-4-3	5/21/09	0.0	0.2	19.3	80.5
V-4-4	5/21/09	0.0	0.0	19.6	80.4
V-4-5	5/21/09	0.0	0.0	19.5	80.5
V-4-6	5/21/09	0.0	0.0	19.6	80.4
GW-1	8/19/09	52.6	46.0	0.4	1.0
GW-2	8/19/09	56.7	39.9	0.5	2.9
GW-3	8/19/09	46.5	25.5	3.4	24.6
GW-4	8/19/09	31.3	37.8	0.1	30.8
GW-5	8/19/09	0.0	10.7	7.7	81.6
GW-6	8/19/09	0.0	1.6	16.1	82.3
GW-7	8/19/09	0.0	4.3	13.1	82.6
GW-8	8/19/09	0.0	6.1	10.8	83.1
GW-9	8/19/09	0.0	4.2	13.5	82.3
GW-10	8/19/09	0.0	0.6	17.6	81.8
GW-11	8/19/09	0.0	5.9	11.8	82.3
GW-12	8/19/09	0.1	13.4	4.0	82.5
BH-201	8/19/09	0.0	1.2	17.4	81.4
BH-301	8/19/09	0.0	1.5	17.8	80.7
V-1-1	8/19/09	29.3	27.8	8.0	34.9
V-1-2	8/19/09	10.3	11.9	11.3	66.5
V-1-3	8/19/09	2.2	6.3	13.1	78.4
V-1-4	8/19/09	0.0	0.1	19.2	80.7
V-1-5	8/19/09	0.0	0.0	19.3	80.7
V-1-6	8/19/09	0.0	0.0	19.3	80.7
V-2-1	8/19/09	22.5	12.0	12.1	53.4
V-2-2	8/19/09	39.6	23.5	6.9	30.0

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Table 8-1 -- Landfill Gas Monitoring Results Collected at KHL OU

Sample Location	Date	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Balance Nitrogen (%)
V-2-3	8/19/09	0.3	2.1	16.3	81.3
V-2-10	8/19/09	0.5	2.7	15.5	81.3
V-2-18	8/19/09	0.0	0.0	18.9	81.1
V-3-1	8/19/09	1.9	1.0	18.3	78.8
V-4-1	8/19/09	0.3	0.4	18.7	80.6
V-4-2	8/19/09	0.0	0.0	18.9	81.1
V-4-3	8/19/09	0.3	0.5	18.6	80.6
V-4-4	8/19/09	0.2	0.4	17.9	81.5
V-4-5	8/19/09	0.0	0.6	18.6	80.8
V-4-6	8/19/09	0.3	11.5	8.5	79.7
GW-1	11/12/09	56.9	43.0	0.1	0.0
GW-2	11/12/09	56.6	37.8	0.0	5.6
GW-3	11/12/09	4.5	5.6	11.7	78.2
GW-4	11/12/09	60.0	39.8	0.2	0.0
GW-5	11/12/09	0.0	9.3	5.7	85.0
GW-6	11/12/09	0.0	1.7	17.0	81.3
GW-7	11/12/09	0.0	3.6	16.3	80.1
GW-8	11/12/09	0.0	5.4	13.4	81.2
GW-9	11/12/09	0.0	1.8	18.5	79.7
GW-10	11/12/09	0.0	3.2	14.0	82.8
GW-11	11/12/09	0.0	1.4	18.5	80.1
GW-12	11/12/09	0.0	4.0	16.6	79.4
BH-201	11/12/09	1.7	5.0	14.6	78.7
V-1-1	11/12/09	58.0	41.9	0.1	0.0
V-1-2	11/12/09	0.9	3.3	17.8	78.0
V-1-3	11/12/09	0.0	0.0	20.7	79.3
V-1-4	11/12/09	0.0	0.1	20.5	79.4
V-1-5	11/12/09	0.0	0.5	19.8	79.7
V-1-6	11/12/09	0.0	0.1	20.4	79.5
V-2-1	11/12/09	38.9	20.7	5.1	35.3
V-2-2	11/12/09	43.6	21.8	7.0	27.6
V-2-3	11/12/09	0.0	0.1	20.6	79.3
V-2-10	11/12/09	0.7	0.7	19.7	78.9
V-2-18	11/12/09	0.0	0.1	20.6	79.3
V-3-1	11/12/09	1.6	0.7	20.0	77.7
V-4-1	11/12/09	2.1	1.4	19.7	76.8
V-4-2	11/12/09	0.0	0.1	20.6	79.3
V-4-3	11/12/09	0.3	1.4	19.1	79.2
V-4-4	11/12/09	0.0	0.1	20.6	79.3
V-4-5	11/12/09	0.0	0.6	20.0	79.4
V-4-6	11/12/09	0.0	0.1	20.5	79.4
GW-1	2/19/10	0.7	0.9	20.3	78.1
GW-2	2/19/10	0.0	0.2	20.6	79.2
GW-3	2/19/10	44.9	15.9	0.0	39.2
GW-4	2/19/10	45.5	38.1	0.6	15.8
GW-5	2/19/10	0.0	0.2	19.4	80.4
GW-6	2/19/10	0.0	0.0	20.2	79.8
GW-7	2/19/10	0.0	0.0	20.5	79.5
GW-8	2/19/10	0.0	0.5	19.0	80.5
GW-9	2/19/10	0.0	0.8	19.8	79.4
GW-10	2/19/10	0.0	0.0	20.1	79.9
GW-11	2/19/10	0.0	0.0	20.4	79.6
GW-12	2/19/10	0.0	0.0	20.6	79.4
BH-301	2/19/10	0.0	0.0	20.3	79.7
V-1-1	2/19/10	22.4	17.4	12.4	47.8
V-1-2	2/19/10	0.3	1.3	18.8	79.6
V-1-3	2/19/10	0.0	0.0	20.4	79.6
V-1-4	2/19/10	0.0	0.0	20.5	79.5
V-1-5	2/19/10	0.0	0.0	20.6	79.4
V-1-6	2/19/10	0.0	0.0	20.6	79.4
V-2-1	2/19/10	0.0	0.0	20.9	79.1
V-2-2	2/19/10	0.0	0.0	19.8	80.2
V-2-3	2/19/10	0.0	0.0	21.0	79.0
V-2-10	2/19/10	0.0	0.0	21.0	79.0
V-2-18	2/19/10	0.0	0.0	21.0	79.0
V-3-1	2/19/10	0.0	0.0	21.0	79.0
V-4-1	2/19/10	0.4	0.7	19.8	79.1
V-4-2	2/19/10	0.0	0.0	20.6	79.4
V-4-3	2/19/10	0.0	0.0	20.4	79.6

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Table 8-1 -- Landfill Gas Monitoring Results Collected at KHL OU

Sample Location	Date	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Balance Nitrogen (%)
V-4-4	2/19/10	0.0	0.0	20.6	79.4
V-4-5	2/19/10	0.0	0.0	20.6	79.4
V-4-6	2/19/10	0.0	0.0	19.4	80.6
GW-1	5/27/10	52.4	47.4	0.2	0.0
GW-2	5/27/10	57.2	42.5	0.3	0.0
GW-3	5/27/10	47.7	22.1	4.8	25.4
GW-4	5/27/10	31.8	34.0	0.1	34.1
GW-5	5/27/10	0.1	1.0	17.3	81.6
GW-6	5/27/10	0.3	0.6	19.7	79.4
GW-7	5/27/10	0.1	1.7	15.3	82.9
GW-8	5/27/10	0.1	4.3	13.2	82.4
GW-9	5/27/10	0.0	1.8	17.8	80.4
GW-10	5/27/10	0.0	0.4	20.1	79.5
GW-11	5/27/10	41.3	24.2	0.0	34.5
GW-12	5/27/10	0.0	1.4	17.7	80.9
BH-1101	5/27/10	0.8	1.5	18.7	79.0
BH-1102	5/27/10	51.2	42.6	4.2	2.0
BH-1103	5/27/10	50.1	45.3	4.4	0.2
BH-1104	5/27/10	28.2	19.2	8.2	44.4
BH-1105	5/27/10	0.4	3.9	12.7	83.0
BH-1106	5/27/10	42.2	49.5	2.4	5.9
BH-1107	5/27/10	0.1	1.5	16.9	81.5
BH-1108	5/27/10	51.7	47.7	0.6	0.0
BH-1109	5/27/10	46.2	17.2	0.5	36.1
BH-1110	5/27/10	0.2	0.6	9.9	89.3
BH-1111	5/27/10	49.3	50.2	0.5	0.0
BH-1112	5/27/10	2.1	11.6	9.4	76.9
BH-1113	5/27/10	47.4	46.3	0.3	6.0
BH-1114	5/27/10	0.0	4.7	15.3	80.0
V-1-1	5/27/10	53.2	46.7	0.1	0.0
V-1-2	5/27/10	12.0	13.4	12.9	61.7
V-1-3	5/27/10	2.8	0.2	20.5	76.5
V-1-4	5/27/10	0.1	0.1	20.6	79.2
V-1-5	5/27/10	0.1	0.6	19.9	79.4
V-1-6	5/27/10	0.1	0.0	20.7	79.2
V-2-1	5/27/10	45.6	24.2	6.9	23.3
V-2-2	5/27/10	34.2	17.6	9.5	38.7
V-2-3	5/27/10	5.8	15.0	4.1	75.1
V-2-10	5/27/10	3.4	7.7	15.5	73.4
V-2-18	5/27/10	0.3	1.3	19.9	78.5
V-3-1	5/27/10	2.8	1.0	19.7	76.5
V-4-1	5/27/10	15.0	6.4	12.4	66.2
V-4-2	5/27/10	0.0	0.3	20.2	79.5
V-4-3	5/27/10	0.3	1.2	19.6	78.9
V-4-4	5/27/10	0.6	1.9	19.6	77.9
V-4-5	5/27/10	0.4	0.4	19.9	79.3
V-4-6	5/27/10	0.6	3.0	15.3	81.1
GW-1	8/26/10	50.5	49.5	0.0	0.0
GW-2	8/26/10	26.5	26.5	5.5	41.5
GW-3	8/26/10	39.3	25.4	2.2	33.1
GW-4	8/26/10	38.8	46.2	0.0	15.0
GW-5	8/26/10	0.2	2.4	17.0	80.4
GW-6	8/26/10	0.2	0.9	19.6	79.3
GW-7	8/26/10	0.3	0.9	19.7	79.1
GW-8	8/26/10	0.2	8.8	13.9	77.1
GW-9	8/26/10	0.3	2.2	18.7	78.8
GW-10	8/26/10	0.2	1.1	18.6	80.1
GW-11	8/26/10	0.2	20.3	2.5	77.0
GW-12	8/26/10	0.3	0.3	20.3	79.1
BH-201	8/26/10	3.4	2.7	18.0	75.9
BH-301	8/26/10	0.2	0.9	19.0	79.9
V-1-1	8/26/10	29.9	29.6	6.3	34.2
V-1-2	8/26/10	0.1	0.2	20.2	79.5
V-1-3	8/26/10	1.2	4.2	16.6	78.0
V-1-4	8/26/10	0.2	0.5	20.0	79.3
V-1-5	8/26/10	0.1	0.2	20.2	79.5
V-1-6	8/26/10	0.0	0.1	20.2	79.7
V-2-1	8/26/10	1.8	1.2	19.4	77.6
V-2-2	8/26/10	18.8	11.3	14.0	55.9

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Table 8-1 -- Landfill Gas Monitoring Results Collected at KHL OU

Sample Location	Date	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Balance Nitrogen (%)
V-2-3	8/26/10	0.2	0.0	20.5	79.3
V-2-10	8/26/10	0.2	0.0	20.4	79.4
V-2-18	8/26/10	0.2	0.2	20.2	79.4
V-3-1	8/26/10	0.3	0.1	20.4	79.2
V-4-1	8/26/10	0.7	11.3	19.5	68.5
V-4-2	8/26/10	0.2	0.4	20.4	79.0
V-4-3	8/26/10	0.2	1.3	18.2	80.3
V-4-4	8/26/10	0.2	0.0	20.6	79.2
V-4-5	8/26/10	0.2	0.1	20.5	79.2
V-4-6	8/26/10	0.3	0.0	20.5	79.2
GW-1	11/19/10	48.7	41.1	1.5	8.7
GW-2	11/19/10	46.2	36.1	0.0	17.7
GW-3	11/19/10	0.0	8.7	11.2	80.1
GW-4	11/19/10	34.8	35.6	0.0	29.6
GW-5	11/19/10	0.0	11.3	6.9	81.8
GW-6	11/19/10	0.0	3.8	15.5	80.7
GW-7	11/19/10	0.0	2.4	18.2	79.4
GW-8	11/19/10	0.0	7.1	14.2	78.7
GW-9	11/19/10	0.0	1.8	18.9	79.3
GW-10	11/19/10	0.0	0.3	19.7	80.0
GW-11	11/19/10	0.0	9.5	9.0	81.5
GW-12	11/19/10	0.0	0.0	20.0	80.0
BH-201	11/19/10	0.0	1.5	18.7	79.8
V-1-1	11/19/10	53.0	42.2	1.3	3.5
V-1-2	11/19/10	1.0	1.2	17.3	80.5
V-1-3	11/19/10	0.0	0.0	20.1	79.9
V-1-4	11/19/10	0.0	0.0	20.1	79.9
V-1-5	11/19/10	0.0	0.0	20.0	80.0
V-1-6	11/19/10	0.0	0.0	20.0	80.0
V-2-1	11/19/10	21.7	16.9	3.8	57.6
V-2-2	11/19/10	37.5	18.4	9.3	34.8
V-2-3	11/19/10	0.0	0.0	20.0	80.0
V-2-10	11/19/10	0.0	0.0	20.0	80.0
V-2-18	11/19/10	0.0	0.0	20.0	80.0
V-3-1	11/19/10	2.8	1.0	19.2	77.0
V-4-1	11/19/10	0.0	0.9	19.2	79.9
V-4-2	11/19/10	0.0	0.3	19.5	80.2
V-4-3	11/19/10	0.0	0.5	19.3	80.2
V-4-4	11/19/10	0.0	0.0	20.0	80.0
V-4-5	11/19/10	0.0	0.6	19.9	79.5
V-4-6	11/19/10	0.0	0.0	20.1	79.9
GW-1	2/28/11	56.5	43.3	0.0	0.2
GW-2	2/28/11	0.0	0.3	19.3	80.4
GW-3	2/28/11	6.4	4.2	14.4	75.0
GW-4	2/28/11	1.5	2.5	17.6	78.4
GW-5	2/28/11	0.0	0.2	19.3	80.5
GW-6	2/28/11	0.0	0.0	19.7	80.3
GW-7	2/28/11	0.0	1.6	17.2	81.2
GW-8	2/28/11	0.0	0.9	17.8	81.3
GW-9	2/28/11	0.0	0.0	19.3	80.7
GW-10	2/28/11	0.0	0.0	19.2	80.8
GW-11	2/28/11	11.0	5.0	0.6	83.4
GW-12	2/28/11	0.0	0.0	19.8	80.2
V-1-1	2/28/11	0.5	0.5	19.8	79.2
V-1-2	2/28/11	0.1	0.5	20.3	79.1
V-1-3	2/28/11	0.0	0.0	20.8	79.2
V-1-4	2/28/11	0.0	0.0	20.8	79.2
V-1-5	2/28/11	0.0	0.0	20.9	79.1
V-1-6	2/28/11	0.0	0.0	20.9	79.1
V-2-1	2/28/11	0.0	0.0	20.3	79.7
V-2-2	2/28/11	0.0	0.0	20.0	80.0
V-2-3	2/28/11	0.0	0.0	20.5	79.5
V-2-10	2/28/11	0.0	0.0	20.6	79.4
V-2-18	2/28/11	0.0	0.0	20.6	79.4
V-3-1	2/28/11	0.0	0.0	20.1	79.9
V-4-1	2/28/11	0.0	0.0	19.6	80.4
V-4-2	2/28/11	0.0	0.0	19.8	80.2
V-4-3	2/28/11	0.0	0.3	19.7	80.0
V-4-4	2/28/11	0.0	0.0	19.8	80.2

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Table 8-1 -- Landfill Gas Monitoring Results Collected at KHL OU

Sample Location	Date	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Balance Nitrogen (%)
V-4-5	2/28/11	0.0	0.0	19.9	80.1
V-4-6	2/28/11	0.0	0.0	19.9	80.1
GW-1	5/12/11	47.6	48.7	0.1	3.6
GW-2	5/12/11	48.7	35.1	0.0	16.2
GW-3	5/12/11	0.1	5.2	12.9	81.8
GW-4	5/12/11	56.8	43.1	0.0	0.1
GW-5	5/12/11	0.0	8.1	10.0	81.9
GW-6	5/12/11	0.0	1.4	19.4	79.2
GW-7	5/12/11	0.0	2.3	18.2	79.5
GW-8	5/12/11	0.0	2.6	17.0	80.4
GW-9	5/12/11	0.0	2.2	18.3	79.5
GW-10	5/12/11	0.0	0.2	20.7	79.1
GW-11	5/12/11	0.0	8.1	12.6	79.3
GW-12	5/12/11	0.1	0.0	20.7	79.2
BH-101	5/12/11	0.0	0.4	20.2	79.4
BH-201	5/12/11	11.6	7.1	13.8	67.5
BH-202	5/12/11	0.0	0.1	20.8	79.1
V-1-1	5/12/11	49.3	50.7	0.0	0.0
V-1-2	5/12/11	0.0	0.0	20.9	79.1
V-1-3	5/12/11	0.0	1.7	19.0	79.3
V-1-4	5/12/11	0.0	0.0	21.0	79.0
V-1-5	5/12/11	0.0	0.0	21.0	79.0
V-1-6	5/12/11	0.0	0.0	21.0	79.0
V-2-1	5/12/11	25.5	13.4	11.2	49.9
V-2-2	5/12/11	36.4	20.3	8.7	34.6
V-2-3	5/12/11	1.1	4.3	15.4	79.2
V-2-10	5/12/11	0.7	1.8	17.2	80.3
V-2-18	5/12/11	0.4	0.6	19.8	79.2
V-3-1	5/12/11	0.9	0.3	20.5	78.3
V-4-1	5/12/11	0.0	0.0	20.5	79.5
V-4-2	5/12/11	0.2	0.1	20.8	78.9
V-4-3	5/12/11	1.8	1.4	20.1	76.7
V-4-4	5/12/11	0.1	0.2	20.5	79.2
V-4-5	5/12/11	0.1	1.9	18.4	79.6
V-4-6	5/12/11	0.1	2.5	18.1	79.3
GW-1	8/18/11	52.9	46.7	0.4	0.0
GW-2	8/18/11	54.8	44.9	0.1	0.2
GW-3	8/18/11	28.2	19.3	5.4	47.1
GW-4	8/18/11	47.9	46.3	1.1	4.7
GW-5	8/18/11	0.0	17.1	5.0	77.9
GW-6	8/18/11	0.0	0.5	22.1	77.4
GW-7	8/18/11	0.0	2.0	22.1	75.9
GW-8	8/18/11	0.0	1.4	21.3	77.3
GW-9	8/18/11	0.0	2.4	21.2	76.4
GW-10	8/18/11	0.0	0.4	22.9	76.7
GW-11	8/18/11	6.5	24.7	0.3	68.5
GW-12	8/18/11	0.0	11.8	10.3	77.9
BH-201	8/18/11	3.0	14.5	6.5	76.0
BH-1101	8/18/11	0.0	0.5	22.9	76.6
BH-V-4-1-1	8/18/11	0.0	11.6	11.7	76.7
BH-V-4-1-2	8/18/11	46.8	41.8	3.2	8.2
BH-V-4-1-3	8/18/11	22.4	20.8	12.6	44.2
BH-V-4-1-4	8/18/11	28.1	23.7	10.4	37.8
BH-V-4-1-5	8/18/11	0.0	8.7	21.1	70.2
BH-V-4-1-6	8/18/11	30.9	36.0	6.4	26.7
BH-V-4-1-7	8/18/11	1.4	15.3	10.3	73.0
BH-V-4-1-8	8/18/11	0.0	1.6	21.7	76.7
BH-V-4-1-9	8/18/11	0.0	7.4	16.2	76.4
V-1-1	8/18/11	49.6	50.1	0.2	0.1
V-1-2	8/18/11	0.1	0.2	21.2	78.5
V-1-3	8/18/11	19.6	6.8	14.6	59.0
V-1-4	8/18/11	0.4	0.2	21.0	78.4
V-1-5	8/18/11	0.2	1.1	19.3	79.4
V-1-6	8/18/11	0.0	0.5	20.2	79.3
V-2-1	8/18/11	26.3	13.1	14.3	46.3
V-2-2	8/18/11	--	--	--	--
V-2-10	8/18/11	0.5	2.6	17.6	79.3
V-2-18	8/18/11	0.0	0.9	20.0	79.1
V-2-3	8/18/11	0.0	0.0	21.5	78.5

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Table 8-1 -- Landfill Gas Monitoring Results Collected at KHL OU

Sample Location	Date	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Balance Nitrogen (%)
V-3-1	8/18/11	1.1	0.5	21.4	77.0
V-4-1	8/18/11	19.9	27.9	2.6	49.6
V-4-2	8/18/11	0.0	0.0	22.8	77.2
V-4-3	8/18/11	0.0	0.2	22.5	77.3
V-4-4	8/18/11	0.0	0.4	22.1	77.5
V-4-5	8/18/11	0.0	1.0	19.0	80.0
V-4-6	8/18/11	0.0	4.9	17.3	77.8
GW-1	11/17/11	61.0	37.7	0.9	0.4
GW-2	11/17/11	36.7	33.9	0.1	29.3
GW-3	11/17/11	1.1	1.6	15.8	81.5
GW-4	11/17/11	62.8	34.8	2.4	0.0
GW-5	11/17/11	0.0	13.2	7.1	79.7
GW-6	11/17/11	0.0	0.1	18.0	81.9
GW-7	11/17/11	0.0	1.3	17.1	81.6
GW-8	11/17/11	0.0	11.4	8.8	79.8
GW-9	11/17/11	0.0	1.2	17.0	81.8
GW-10	11/17/11	0.0	2.4	14.8	82.8
GW-11	11/17/11	0.0	15.4	4.5	80.1
GW-12	11/17/11	0.0	0.0	20.1	79.9
GW-13	11/17/11	60.1	39.3	0.3	0.3
GW-14	11/17/11	2.8	3.7	5.6	87.9
GW-15	11/17/11	0.0	1.3	16.1	82.6
GW-16	11/17/11	0.0	0.5	17.5	82.0
GW-17	11/17/11	0.0	1.6	16.5	81.9
BH-201	11/17/11	0.0	3.1	16.7	80.2
BH-1301	11/17/11	0.0	0.0	17.9	82.1
V-1-1	11/17/11	41.4	30.2	7.1	21.3
V-1-2	11/17/11	1.2	2.6	17.2	79.0
V-1-3	11/17/11	0.0	0.0	19.1	80.9
V-1-4	11/17/11	0.0	0.0	19.1	80.9
V-1-5	11/17/11	0.0	0.0	19.1	80.9
V-1-6	11/17/11	0.0	0.0	18.4	81.6
V-2-1	11/17/11	0.0	0.0	18.8	81.2
V-2-2	11/17/11	11.3	5.5	15.9	67.3
V-2-3	11/17/11	0.0	0.0	19.0	81.0
V-2-10	11/17/11	0.0	0.0	19.0	81.0
V-2-18	11/17/11	0	0	18.8	81.2
V-3-1	11/17/11	0	0	18.9	81.1
V-4-1	11/17/11	0.5	0.5	19.8	79.2
V-4-2	11/17/11	1.1	1.5	18.6	78.8
V-4-3	11/17/11	0.1	1	19.1	79.8
V-4-4	11/17/11	0	0.1	19.9	80
V-4-5	11/17/11	0	0	20.2	79.8
V-4-6	11/17/11	0	0	20.2	79.8
GW-1	2/16/2012	59.1	42.9	0.4	0.0
GW-2	2/16/2012	8.5	7.4	16.8	67.3
GW-3	2/16/2012	0.1	0.7	19.8	79.4
GW-4	2/16/2012	63.7	34.0	0.8	1.5
GW-5	2/16/2012	0.0	9.3	7.2	83.5
GW-6	2/16/2012	0.0	0.4	21.2	78.4
GW-7	2/16/2012	0.0	2.1	18.7	79.2
GW-8	2/16/2012	0.0	5.2	15.8	79.0
GW-9	2/16/2012	0.0	1.5	19.2	79.3
GW-10	2/16/2012	0.0	6.7	7.4	85.9
GW-11	2/16/2012	0.0	7.0	12.7	80.3
GW-12	2/16/2012	0.0	0.1	21.5	78.4
GW-13	2/16/2012	54.9	43.7	0.7	0.7
GW-14	2/16/2012	1.3	3.9	14.4	80.4
GW-15	2/16/2012	0.0	3.3	17.0	79.7
GW-16	2/16/2012	0.0	1.4	19.8	78.8
GW-17	2/16/2012	0.0	0.5	20.8	78.7
BH-201	2/16/2012	0.0	0.1	21.3	78.6
BH-1301	2/16/2012	0.0	0.6	21.2	78.2
BH-1302	2/16/2012	13.1	10.7	16.8	59.4
BH-1303	2/16/2012	0.0	0.2	21.4	78.4
V-1-1	2/16/2012	6.4	4.9	19.7	69.0
V-1-2	2/16/2012	1.4	1.9	21.0	75.7
V-1-3	2/16/2012	0.1	0.1	21.0	78.8

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Table 8-1 -- Landfill Gas Monitoring Results Collected at KHL OU

Sample Location	Date	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Balance Nitrogen (%)
V-1-4	2/16/2012	0.0	0.1	21.9	78.0
V-1-5	2/16/2012	0.0	0.1	21.9	78.0
V-1-6	2/16/2012	0.0	0.1	21.9	78.0
V-2-1	2/16/2012	1.5	0.9	20.9	76.7
V-2-2	2/16/2012	15.0	7.5	17.0	60.5
V-2-3	2/16/2012	0.0	0.1	21.6	78.3
V-2-10	2/16/2012	0.0	0.1	21.7	78.2
V-2-18	2/16/2012	0.1	0.1	21.8	78.0
V-3-1	2/16/2012	0.0	0.1	21.5	78.4
V-4-1	2/16/2012	1.2	1.3	20.1	77.4
V-4-2	2/16/2012	0.6	0.8	20.5	78.1
V-4-3	2/16/2012	0.5	0.6	20.7	78.2
V-4-4	2/16/2012	0.0	0.1	21.5	78.4
V-4-5	2/16/2012	0.0	0.2	21.3	78.5
V-4-6	2/16/2012	0.1	0.1	21.2	78.6
GW-1	6/7/2012	47.6	45.9	0.0	6.5
GW-2	6/7/2012	41.5	38.5	0.0	20.0
GW-3	6/7/2012	40.2	20.2	0.0	39.6
GW-4	6/7/2012	33.3	40.6	0.3	25.8
GW-5	6/7/2012	0.3	10.8	10.3	78.6
GW-6	6/7/2012	0.3	4.5	16.9	78.3
GW-7	6/7/2012	0.2	2.6	18.0	79.2
GW-8	6/7/2012	0.3	6.9	15.3	77.5
GW-9	6/7/2012	0.3	3.2	18.5	78.0
GW-10	6/7/2012	0.0	8.6	14.7	76.6
GW-11	6/7/2012	0.2	13.3	9.3	77.2
GW-12	6/7/2012	0.2	4.4	16.5	78.9
GW-13	6/7/2012	48.5	49.6	0.0	1.9
GW-14	6/7/2012	5.1	8.4	4.2	82.3
GW-15	6/7/2012	0.2	5.8	15.1	78.9
GW-16	6/7/2012	0.3	4.3	17.1	78.3
GW-17	6/7/2012	0.0	0.7	20.5	78.8
BH-3-01	6/7/2012	0.6	1.5	19.6	78.3
BH-13-01	6/7/2012	29.2	26.7	4.8	39.3
BH-13-02	6/7/2012	0.3	0.4	20.5	78.8
BH-13-03	6/7/2012	23.8	21.1	9.7	45.4
BH-13-04	6/7/2012	0.2	0.1	20.9	78.8
BH-13-05	6/7/2012	14.1	4.8	15.8	65.3
BH-13-06	6/7/2012	0.5	1.5	20.3	77.7
BH-13-07	6/7/2012	0.3	0.6	20.3	78.8
BH-13-08	6/7/2012	0.3	1.1	20.3	78.3
BH-14-01	6/7/2012	0.0	0.6	19.9	79.5
V-1-1	6/7/2012	29.0	25.1	9.5	36.4
V-1-2	6/7/2012	0.0	0.1	20.4	79.5
V-1-3	6/7/2012	0.2	0.5	20.2	79.1
V-1-4	6/7/2012	0.0	0.4	20.3	79.3
V-1-5	6/7/2012	0.3	3.3	16.7	79.7
V-1-6	6/7/2012	0.0	0.3	20.3	79.4
V-2-1	6/7/2012	5.8	2.6	18.7	72.9
V-2-2	6/7/2012	15.8	7.7	16.7	59.8
V-2-3	6/7/2012	0.0	0.5	20.1	79.4
V-2-10	6/7/2012	0.1	0.6	20.0	79.3
V-2-18	6/7/2012	0.0	1.1	19.4	79.5
V-3-1	6/7/2012	0.1	0.0	20.6	79.3
V-4-1	6/7/2012	0.4	0.5	20.5	78.6
V-4-2	6/7/2012	0.3	3.1	18.7	77.9
V-4-3	6/7/2012	0.1	3.2	18.3	78.4
V-4-4	6/7/2012	0.1	0.2	20.7	79.0
V-4-5	6/7/2012	0.2	0.0	20.9	78.9
V-4-6	6/7/2012	0.2	0.1	20.9	78.8
GW-1	8/23/2012	54.2	45.6	0.0	6.5
GW-2	8/23/2012	52.9	45.2	0.1	20.0
GW-3	8/23/2012	25.2	31.5	0.1	39.6
GW-4	8/23/2012	45.9	45.8	0.0	25.8
GW-5	8/23/2012	0.4	13.5	9.6	78.6

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Table 8-1 -- Landfill Gas Monitoring Results Collected at KHL OU

Sample Location	Date	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Balance Nitrogen (%)
GW-6	8/23/2012	0.3	7.7	14.4	78.3
GW-7	8/23/2012	0.3	5.0	16.4	79.2
GW-8	8/23/2012	0.4	14.4	9.5	77.5
GW-9	8/23/2012	0.4	3.8	17.7	78.0
GW-10	8/23/2012	0.3	13.9	4.4	76.6
GW-11	8/23/2012	0.1	5.2	14.2	77.2
GW-12	8/23/2012	0.0	10.1	10.5	78.9
GW-13	8/23/2012	51.8	48.0	0.0	1.9
GW-14	8/23/2012	19.6	13.2	0.9	82.3
GW-15	8/23/2012	0.4	7.4	12.5	78.9
GW-16	9/6/2012	0.1	4.9	17.2	78.3
GW-17	9/6/2012	0.1	3.9	19.7	78.8
BH-2-01	8/23/2012	0.2	1.4	19.8	78.3
BH-13-01	8/23/2012	25.6	21.3	6.4	39.3
BH-13-02	8/23/2012	0.2	0.7	20.0	78.8
BH-13-03	8/23/2012	44.6	33.7	3.0	45.4
BH-13-04	8/23/2012	0.1	0.4	20.2	78.8
BH-13-05	8/23/2012	9.0	6.5	15.1	65.3
BH-13-06	8/23/2012	0.2	0.1	20.3	77.7
BH-13-07	8/23/2012	0.2	0.3	20.2	78.8
BH-13-08	8/23/2012	0.1	0.1	20.4	78.3
BH-14-01	8/23/2012	0.3	1.9	19.4	79.5
V-1-1	8/23/2012	44.4	34.9	9.6	36.4
V-1-2	8/23/2012	1.6	1.1	20.6	79.5
V-1-3	8/23/2012	0.2	0.0	21.4	79.1
V-1-4	8/23/2012	15.1	13.6	12.0	79.3
V-1-5	8/23/2012	0.4	0.1	21.1	79.7
V-1-6	8/23/2012	4.2	7.5	16.0	79.4
V-2-1	8/23/2012	19.8	11.1	14.5	72.9
V-2-2	8/23/2012	8.5	4.3	19.1	59.8
V-2-3	8/23/2012	0.2	0.0	21.4	79.4
V-2-10	8/23/2012	0.5	0.3	21.1	79.3
V-2-18	8/23/2012	0.4	0.0	21.2	79.5
V-3-1	9/6/2012	0.5	0.1	20.9	79.3
V-4-1	8/23/2012	0.2	0.2	20.3	78.6
V-4-2	8/23/2012	0.2	0.2	20.2	77.9
V-4-3	8/23/2012	0.1	0.1	20.4	78.4
V-4-4	8/23/2012	0.0	0.5	19.9	79.0
V-4-5	8/23/2012	0.0	0.2	20.4	78.9
V-4-6	8/23/2012	0.0	0.5	20.4	78.8
GW-1	11/8/2012	57.3	42.5	0	0.2
GW-2	11/8/2012	49.6	39	0	11.4
GW-3	11/8/2012	22	18.5	0.8	58.7
GW-4	11/8/2012	60.4	38.9	0	0.7
GW-5	11/8/2012	0	11.4	8.4	80.2
GW-6	11/8/2012	0	4.7	16	79.3
GW-7	11/8/2012	0	2.7	17.8	79.5
GW-8	11/8/2012	0	11.2	9.3	79.5
GW-9	11/8/2012	0	3	17.1	79.9
GW-10	11/8/2012	0	10.9	8.1	81
GW-11	11/8/2012	0	10.1	9.8	80.1
GW-12	11/8/2012	0	4.2	15.8	80
GW-13	11/8/2012	58	40.7	0.7	0.6
GW-14	11/8/2012	15.7	7.8	1.2	75.3
GW-15	11/8/2012	0	7.3	11.4	81.3
GW-16	11/8/2012	0	5.2	16	78.8
GW-17	11/8/2012	0	5.3	15.9	78.8
BH-2-01	11/8/2012	0	3	15.9	81.1
BH-13-01	11/8/2012	60	38.6	1.4	0
BH-13-02	11/8/2012	0	1.2	12.9	85.9
BH-13-03	11/8/2012	20.8	19	6	54.2
BH-13-04	11/8/2012	0	3.6	16.2	80.2
BH-13-05	11/8/2012	0	0.7	19.5	79.8
BH-14-01	11/8/2012	0	0.5	19.3	80.2
V-1-1	11/8/2012	38.8	33.5	5.3	22.4

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Table 8-1 -- Landfill Gas Monitoring Results Collected at KHL OU

Sample Location	Date	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Balance Nitrogen (%)
V-1-2	11/8/2012	0.7	2.7	18.2	78.4
V-1-3	11/8/2012	0	0.1	20.6	79.3
V-1-4	11/8/2012	0	0.1	20.7	79.2
V-1-5	11/8/2012	0	0.1	20.6	79.3
V-1-6	11/8/2012	0	0.3	20.5	79.2
V-2-1	11/8/2012	0	0.1	20.2	79.7
V-2-2	11/8/2012	4.7	2.4	18	74.9
V-2-3	11/8/2012	0	0.1	20.6	79.3
V-2-10	11/8/2012	0	0.1	20.6	79.3
V-2-18	11/8/2012	0	0.1	20.6	79.3
V-3-1	11/8/2012	0	0.1	20.2	79.7
V-4-1	11/8/2012	0.4	0.5	20.1	79
V-4-2	11/8/2012	0	0.1	20.3	79.6
V-4-3	11/8/2012	0	0.8	19.6	79.6
V-4-4	11/8/2012	0	0.1	20.2	79.7
V-4-5	11/8/2012	0	0.5	19.8	79.7
V-4-6	11/8/2012	0	0.1	19.8	80.1
Storage Shed	11/8/2012	0	0	20.7	79.3
GW-1	2/21/2013	53.5	41.7	0.1	4.7
GW-2	2/21/2013	26.1	21.7	0.0	52.2
GW-3	2/21/2013	19.0	7.5	1.5	72.0
GW-4	2/21/2013	60.0	37.0	0.0	3.0
GW-5	2/21/2013	0.1	7.4	10.7	81.8
GW-6	2/21/2013	0.1	2.7	18.7	78.5
GW-7	2/21/2013	0.1	1.7	20.7	77.5
GW-8	2/21/2013	0.1	5.7	13.4	80.8
GW-9	2/21/2013	0.2	1.5	20.7	77.6
GW-10 ¹¹	2/21/2013	--	--	--	--
GW-11	2/21/2013	0.1	0.5	21.9	77.5
GW-12	2/21/2013	0.2	2.0	20.2	77.6
GW-13	2/21/2013	56.5	42.6	0.8	0.1
GW-14	2/21/2013	14.3	2.9	3.3	79.5
GW-15	2/21/2013	0.1	5.0	15.4	79.5
GW-16	2/21/2013	0.1	3.1	19.4	77.4
GW-17	2/21/2013	0.1	4.4	16.9	78.6
BH-14-01	2/21/2013	0.1	0.1	22.1	77.7
Storage Shed	2/21/2013	0.0	0.1	16.9	83.0

Notes:

- Landfill gas monitoring results provided by CTI and Associates, Inc. using a GEM™ 2000 gas analyzer from April 27, 2003 to May 21, 2004.
- Landfill gas monitoring results provided by Golder Associates, Inc. using a GEM™ 500 gas analyzer from September 29, 2004 to May 8, 2006, November 8, 2006, May 10, 2007, and August 6, 2008.
- Landfill gas monitoring results provided by Golder Associates, Inc. using a GEM™ 2000 gas analyzer on September 7, 2006, February 8, 2007, August 8, 2007, October 31, 2007, May 15, 2008, November 5, 2008, February 5, 2009, May 21, 2009, August 19, 2009, and November 12, 2009.
- Landfill gas monitoring results provided by ARCADIS using a GEM™ 500 portable gas analyzer on February 19, 2010, May 27, 2010, August 26, 2010, November 19, 2010, February 28, 2011, May 12, 2011, August 18, 2011, November 17, 2011, February 16, 2012, June 7, 2012, August 23, 2012, September 6, 2012, and November 8, 2012.
- On February 8, 2006, three other borings were attempted at the location of BH-201, but the boreholes were too wet to provide an accurate reading.
- The water level at the location of the borehole was too high to provide an accurate reading.
- On February 8, 2007, methane concentrations were detected above the LEL at GW-3; however, temporary boreholes were not installed to delineate the extent of the methane due to a health and safety risk created by snow covered rocks along the river.
- On February 8, 2007, the valve on GW-6 was frozen and the cap could not be removed. The concentrations presented for GW-6 were obtained from a temporary borehole, which was installed directly next to well.
- An additional temporary borehole(s) was not installed west of permanent gas probe GW-11 to delineate the extent of methane concentrations above the LEL toward the adjacent Kalamazoo Metal Recyclers, Inc. property due to the amount of debris located underneath the ground surface along the western property line of the KHL OU.
- Due to rapid fluctuations in the gas concentration readings on the GEM™ 2000 portable gas analyzer, the concentrations for all parameters (i.e., CH₄, O₂, and CO₂) could not be determined from the same reading, producing a balance nitrogen concentration for GW-1 less than zero.
- As verbally directed by MDEQ in the field, permanent gas probe GW-10 was not monitored due to low readings in GW-5, GW-6, and GW-7.
- CH₄ = Methane.
- CO₂ = Carbon Dioxide.
- O₂ = Oxygen.
- GW = Permanent gas probe.
- BH = Temporary borehole.
- V = Gas vent.
- = gas vent was not monitored.

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Table 8-2 -- Gas-Venting Layer Placement at KHL OU

Date	Volume Placed (cubic yards)	Cumulative Total (cubic yards)
10/19/99	311	311
10/20/99	3,752	4,063
10/21/99	1,728	5,791
10/22/99	1,600	7,391
10/23/99	2,112	9,503
10/25/99	3,220	12,723
10/26/99	1,616	14,339
10/27/99	2,128	16,467
10/29/99	1,440	17,907
11/1/99	1,421	19,328
11/2/99	1,408	20,736

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Table 8-3 -- Depth Verification Results - Gas-Venting Layer at KHL OU

Test Number	Date	Layer Thickness (inches)	Corrective Action ¹
1	10/20/99	5	1 inch of additional material was placed
2	10/20/99	6	N/A
3	10/20/99	6	N/A
4	10/20/99	8	N/A
5	10/20/99	7	N/A
6	10/20/99	7	N/A
7	10/20/99	6	N/A
8	10/20/99	8	N/A
9	10/20/99	7	N/A
10	10/20/99	8	N/A
11	10/20/99	8	N/A
12	10/20/99	8	N/A
13	10/20/99	7	N/A
14	10/20/99	6.5	N/A
15	10/20/99	5	1 inch of additional material was placed
16	10/20/99	6	N/A
17	10/20/99	5	1 inch of additional material was placed
18	10/20/99	8	N/A
19	10/21/99	7	N/A
20	10/21/99	6	N/A
21	10/21/99	7	N/A
22	10/21/99	8.5	2 inches of additional material was removed
23	10/21/99	7	N/A
24	10/21/99	8	N/A
25	10/21/99	7	N/A
26	10/21/99	7	N/A
27	10/21/99	6	N/A
28	10/21/99	7	N/A
29	10/21/99	6	N/A
30	10/21/99	6.5	N/A
31	10/21/99	8	N/A
32	10/21/99	8	N/A
33	10/21/99	6	N/A
34	10/21/99	8	N/A
35	10/21/99	8	N/A
36	10/21/99	8	N/A
37	10/21/99	6	N/A
38	10/21/99	7	N/A
39	10/21/99	7	N/A
40	10/21/99	6	N/A
41	10/22/99	8	N/A
42	10/22/99	7	N/A
43	10/22/99	6	N/A
44	10/22/99	7	N/A
45	10/22/99	9	3 inches of excess material was removed
46	10/22/99	6	N/A
47	10/22/99	8.5	2.5 inches of excess material was removed
48	10/22/99	7	N/A
49	10/22/99	7.5	N/A
50	10/22/99	6	N/A
51	10/23/99	6	N/A
52	10/23/99	8	N/A
53	10/23/99	7	N/A
54	10/23/99	6.5	N/A
55	10/23/99	9	3 inches of excess material was removed
56	10/23/99	6	N/A
57	10/23/99	7	N/A
58	10/23/99	6	N/A
59	10/23/99	7	N/A
60	10/23/99	6	N/A
61	10/23/99	6	N/A
62	10/23/99	6	N/A
63	10/23/99	7	N/A
64	10/23/99	6	N/A
65	10/25/99	7	N/A

See Notes on Page 2.

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Table 8-3 -- Depth Verification Results - Gas-Venting Layer at KHL OU

Test Number	Date	Layer Thickness (inches)	Corrective Action ¹
66	10/25/99	7	N/A
67	10/25/99	8	N/A
68	10/25/99	8	N/A
69	10/25/99	7	N/A
70	10/25/99	7	N/A
71	10/25/99	6	N/A
72	10/25/99	6	N/A
73	10/25/99	8	N/A
74	10/25/99	8.5	2 inches of excess material was removed
75	10/25/99	7	N/A
76	10/25/99	6	N/A
77	10/25/99	7	N/A
78	10/25/99	7	N/A
79	10/25/99	6	N/A
80	10/26/99	6	N/A
81	10/26/99	7	N/A
82	10/26/99	7	N/A
83	10/26/99	8	N/A
84	10/26/99	6	N/A
85	10/26/99	7	N/A
86	10/26/99	7	N/A
87	10/26/99	7	N/A
88	10/26/99	6	N/A
89	10/26/99	8	N/A
90	10/26/99	8.5	2 inches of excess material was removed
91	10/27/99	8	N/A
92	10/27/99	7	N/A
93	10/27/99	6	N/A
94	10/27/99	6	N/A
95	10/27/99	8	N/A
96	10/27/99	7	N/A
97	10/27/99	6	N/A
98	10/27/99	6	N/A
99	10/27/99	6	N/A
100	10/27/99	6	N/A
101	10/27/99	7	N/A
102	10/27/99	6	N/A
103	10/30/99	7	N/A
104	10/30/99	6	N/A
105	10/30/99	6	N/A
106	10/30/99	7	N/A
107	10/30/99	6	N/A
108	10/30/99	6	N/A
109	10/30/99	7	N/A
110	10/30/99	6	N/A
111	11/1/99	7	N/A
112	11/1/99	7	N/A
113	11/1/99	7	N/A
114	11/1/99	8	N/A
115	11/2/99	8.5	2 inches of excess material was removed
116	11/2/99	8	N/A
117	11/2/99	7	N/A
118	11/2/99	8	N/A
119	11/2/99	8	N/A
120	11/2/99	6	N/A
121	11/2/99	8	N/A
122	11/2/99	7	N/A
123	11/2/99	8	N/A
124	11/2/99	7	N/A
125	11/2/99	6	N/A
Average Layer Thickness		6.9	

Notes:

1. N/A = Not applicable.

¹ Minimum gas-venting layer thickness was 6 inches with a maximum 2-inch overage allowed. Areas thicker than 8 inches resulted in removal of excess material; areas less than 6 inches results in placement of additional material.

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Table 8-4 -- Geomembrane Installation at KHL OU

Date	Panel Numbers	Area Placed (square feet)	Cumulative Area (square feet)
10/22/99	1 - 4	11,814	11,814
10/25/99	5 - 10	23,430	35,244
10/26/99	11 - 16	17,358	52,602
10/27/99	17 - 27	61,072	113,674
10/28/99	28 - 38	61,952	175,626
10/29/99	39 - 44	42,284	217,910
10/30/99	45 - 49	30,822	248,732
11/1/99	50 - 60	80,366	329,098
11/4/99	61 - 67	31,900	360,998
11/5/99	68 - 75	34,034	395,032
11/6/99	76 - 81	27,786	422,818
11/7/99	82 - 91	55,946	478,764
11/8/99	92 - 103	41,976	520,740
11/9/99	104 - 113	27,720	548,460
11/11/99	114 - 132	48,136	596,596
11/12/99	133 - 147	48,444	645,040
11/13/99	148 - 154	28,314	673,354
11/15/99	155 - 167	49,126	722,480

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Table 8-5 -- Barrier Protection Layer Placement at KHL OU

Date	Volume Placed (cubic yards)	Cumulative Total (cubic yards)
11/16/99	3,372	3,372
11/17/99	3,331	6,703
11/18/99	3,789	10,492
11/19/99	3,837	14,329
11/20/99	2,358	16,687
11/22/99	3,948	20,635
11/24/99	2,256	22,891
11/29/99	3,450	26,341
11/30/99	2,063	28,404
12/1/99	2,205	30,609
12/2/99	2,432	33,041
12/3/99	3,349	36,390
12/4/99	1,396	37,786
12/6/99	2,755	40,541
12/7/99	3,335	43,876
12/8/99	2,443	46,319
12/9/99	3,113	49,432
12/10/99	3,112	52,544
12/11/99	1,612	54,156
12/13/99	2,709	56,865
12/14/99	2,648	59,513
12/15/99	1,396	60,909
12/16/99	1,336	62,245
12/17/99	1,351	63,596

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Table 8-6 -- Depth Verification Results - Drainage/Barrier Protection Soil Layer at KHL OU

Test Number	Layer Thickness ² (inches)	Corrective Action ¹
1	>24	N/A
2	>24	N/A
3	>24	N/A
4	26	N/A
5	>24	N/A
6	>24	N/A
7	>24	N/A
8	25	N/A
9	>24	N/A
10	27	3 inches of excess material was removed
11	>24	N/A
12	>24	N/A
13	27	3 inches of excess material was removed
14	28	4 inches of excess material was removed
15	27	3 inches of excess material was removed
16	24	N/A
17	26	N/A
18	>24	N/A
19	>24	N/A
20	28	4 inches of excess material was removed
21	24	N/A
22	27	3 inches of excess material was removed
23	>24	N/A
24	24	N/A
25	>24	N/A
26	>24	N/A
27	27	3 inches of excess material was removed
28	27	3 inches of excess material was removed
29	24	N/A
30	28	4 inches of excess material was removed
31	24	N/A
32	>24	N/A
33	27	3 inches of excess material was removed
34	26	N/A
35	>24	N/A
36	28	4 inches of excess material was removed
37	27	3 inches of excess material was removed
38	25	N/A
39	27	3 inches of excess material was removed
40	>24	N/A
41	25	N/A
42	28	4 inches of excess material was removed
43	>24	N/A
44	27	3 inches of excess material was removed
45	27	3 inches of excess material was removed
46	25	N/A
47	27	3 inches of excess material was removed
48	25	N/A
49	>24	N/A
50	24	N/A
51	24	N/A
Average Layer Thickness	25	

Notes:

1. N/A = Not applicable.

¹ Minimum barrier protection layer thickness was 24 inches.

² Calculation of average layer thickness assumed that ">24" inches equaled 24 inches.

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Table 8-7 -- Vegetative Layer Placement at KHL OU

Date	Volume Placed (cubic yards)	Cumulative Total (cubic yards)
1/21/00	400	400
2/3/00	2,105	2,505
2/4/00	1,740	4,245
2/7/00	2,890	7,135
2/8/00	1,410	8,545
2/9/00	1,152	9,697
2/14/00	2,304	12,001
2/15/00	1,715	13,716
2/16/00	1,200	14,916
5/8/00	2,160	17,076
5/25/00	1,530	18,606
5/26/00	1,360	19,966
6/7/00	1,640	21,606

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Table 8-8 -- Depth Verification Results - Vegetative Layer at KHL OU

Test Number	Layer Thickness (inches)	Corrective Action ¹
1	6	N/A
2	6.5	N/A
3	6	N/A
4	6	N/A
5	6	N/A
6	6.5	N/A
7	7	N/A
8	6	N/A
9	6	N/A
10	6.5	3 inches of excess material was removed
11	6	N/A
12	6	N/A
13	6	3 inches of excess material was removed
14	6	4 inches of excess material was removed
15	6	3 inches of excess material was removed
16	6.5	N/A
17	6	N/A
18	6	N/A
19	7	N/A
20	7	4 inches of excess material was removed
21	6	N/A
22	6	3 inches of excess material was removed
23	6	N/A
24	6	N/A
25	6	N/A
26	6.5	N/A
27	6	3 inches of excess material was removed
28	6	3 inches of excess material was removed
29	6	N/A
30	7	4 inches of excess material was removed
31	6.5	N/A
32	6	N/A
33	6	3 inches of excess material was removed
34	6	N/A
35	6	N/A
36	6	4 inches of excess material was removed
37	6	3 inches of excess material was removed
38	6	N/A
39	6.5	3 inches of excess material was removed
40	6	N/A
41	6	N/A
42	7	4 inches of excess material was removed
43	6	N/A
44	6	3 inches of excess material was removed
45	6	3 inches of excess material was removed
46	6	N/A
47	6	3 inches of excess material was removed
48	6	N/A
49	6	N/A
Average Layer Thickness	6.2	

Note:

1. N/A = Not applicable.

¹ Minimum vegetative layer thickness was 6 inches. Areas thicker than 8 inches resulted in removal of excess material; areas less than 6 inches resulted in placement of additional material.

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Table 9-1 -- Summary of QA/QC Testing Frequencies at KHL OU

Cover Component	Test	Test Method	Parameter	Minimum Required Frequency	Actual Frequency	Testing Result Averages
General Fill	Particle Size	Hand Measurement ¹	100% smaller than 12-inches/100% smaller than 6-inches ²	Daily	Daily	100% smaller than 12-inches/100% smaller than 6-inches ²
Gas-Venting Layer	Particle Size	ASTM D117/136	95-100% passing the No. 4 sieve, maximum 5% by weight passing No. 200 sieve ³	1 per 1,000 cy installed	1 per 720 cy installed ⁴	97% passing the No. 4 sieve, maximum 1.2% by weight passing No. 200 sieve
	Permeability	ASTM D-2434	Minimum 1×10^{-3} cm/sec	1 per 5,000 cy installed	1 per 3,781 cy installed ⁴	1.34×10^{-3} cm/sec
	Thickness Verification	Hand Measurement ¹	Minimum 6 inches	3 per acre	7.8 per acre	6.9 inches
Barrier Protection Layer	Particle Size	ASTM D117/136	95-100% passing the No. 4 sieve	1 per 5,000 cy installed ⁵	1 per 4,543 cy installed ⁶	97% passing the No. 4 sieve 1.8% passing the No. 200 sieve
	Thickness Verification	Hand Measurement ¹	Minimum 24 inches	3 per acre	3.2 per acre ⁷	25.3 inches
Vegetative Layer	Thickness Verification	Hand Measurement ¹	Minimum 6 inches	3 per acre	3.0 per acre ⁷	6.2 inches
Geomembrane	Destructive Test	ASTM D4437 (NSF 54 Modified)	Pass/Fail	1 per 500 linear feet of seam	1 per 455 linear feet of seam	Pass

Notes:

¹ Measurements were collected by hand excavation and soft shovel for direct depth measurement using a ruler.

² General fill placed to within one foot of the gas venting layer would contain no objects larger than 12 inches in greatest dimension; fill placed within one foot of the gas venting layer contained no objects larger than 6 inches in greatest dimension.

³ Percent passing No. 4 sieve was changed from 100% to 95-100% on December 27, 1999.

⁴ Based on 15,000 cubic yards (cy) in place.

⁵ See text in Section 9.4 regarding particle size testing frequency.

⁶ Based on 63,600 cy in place.

⁷ Based on 15 acres, the approximate area of the landfill (refer to Section 1.1 of the Final Report for Completion of Construction).

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Table 9-2 -- Gas-Venting Layer Permeability Test Results

Sample Date	Sample ID ¹	Average Coefficient of Permeability (cm/sec)
10/21/99	H87500	1.14 ⁻³
10/25/99	H87505	1.15 ⁻³
10/28/99	H87510	1.82 ⁻³
11/3/99	H87515	1.23 ⁻³
Mean		1.34 ⁻³

Notes:

1.cm/sec = centimeters per second.

¹ Tests were conducted at a frequency of one per 3,780 cy installed.

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Table 11-1 -- Summary of Key Communications and Events: June 2006 -- September 2011

Date	Description of Key Communication or Event
June 27, 2006	MDEQ issues Formal Disapproval of the Draft Final Report for Completion of Construction and identifies issues with methane exceedances and components of the remedy located within the MDOT Right-of-Way (the institutional control issue)
July 6, 2006	Georgia-Pacific submits the Permit Application for Use of a Portion of the MDOT Right-of-Way to MDOT to allow use of the MDOT Right-of-Way inside the security fence
July 26, 2006	Georgia-Pacific submits Addressing Deficiencies Identified in MDEQ's June 27, 2006 Letter to Georgia-Pacific in response to MDEQ's June 27, 2006 letter
July 31, 2006	Georgia-Pacific submits Work Plan for Additional Activities at the King Highway Landfill to MDEQ in response to MDEQ's June 27, 2006 letter
October 26, 2006	MDOT issues Permit for Use of State Trunkline Right-of-Way Form for the KHL OU to Georgia-Pacific for use of the MDOT Right-of-Way inside the security fence
July 11, 2007	MDEQ and Georgia-Pacific meet at the KHL OU - Georgia-Pacific is informed that the City of Kalamazoo may own a portion of the Right-of-Way and that the MDOT permit is not a satisfactory remedy; MDEQ proposes options for addressing the Right-of-Way issue
September 14, 2007	Georgia-Pacific submits Institutional Control Plan for the KHL OU to USEPA in support of the 5-Year Review Process
September 20, 2007	MDEQ issues Outstanding Deliverables and Notice of Violation at the KHL OU
October 9, 2007	Georgia-Pacific submits Response to September 20, 2007 Letter Regarding Outstanding Deliverables and Notice of Violation and invokes dispute resolution (includes Expanded Plan for Mitigating Methane Gas Concentrations at KHL)
October 18, 2007	USEPA issues the Five-Year Review Report for the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site in which it acknowledges that the remedy at the KHL OU is functioning as intended; however, issues associated with methane gas migration and institutional controls need to be addressed for the remedy to be protective in the long-term
November 7, 2007	Georgia-Pacific submits Update Regarding the Acquisition of the MDOT Property along the KHL OU to MDEQ
December 7, 2007	MDEQ issues a response to Georgia-Pacific's October 9, 2007 letter invoking dispute resolution and proposes an alternative approach; MDEQ proposes to meet to discuss a new schedule for completion of construction
December 18, 2007	Georgia-Pacific submits Response to December 7, 2007 Letter Regarding Process for Resolving the Dispute to MDEQ
January 8, 2008	MDEQ, MDAG, and Georgia-Pacific meet in Lansing, MI to discuss a modified schedule for completing installation of the landfill gas controls and acquiring portions of the MDOT Right-of-Way
January 15, 2008	Georgia-Pacific submits Summary of January 8, 2008 Meeting to Discuss Revised AOC Schedule; submittal includes a Potential Schedule for Completing Response Activities at the KHL OU
January 21, 2008	Georgia-Pacific initiates installation of landfill gas cutoff trench (Trench C) at the southeast corner of the KHL OU
January 29, 2008	Georgia-Pacific initiates installation of landfill gas cutoff trench (Trench D), work is stopped when paper-making residuals are encountered
January 31, 2008	MDEQ and Georgia-Pacific meet at KHL to investigate the presence of residuals - three test pits are excavated and sampled for PCBs
January 31, 2008	Georgia-Pacific submits e-mail summarizing events of January 31, 2008 meeting to MDEQ
February 6, 2008	Georgia-Pacific submits Proposed Activities in the Vicinity of the King Highway Right-of-Way Work Plan to MDEQ - outlines proposed soil boring investigation program to delineate extent of residuals
February 8, 2008	MDEQ approves the February 6, 2008 Work Plan
February 19-20, 2008	Georgia-Pacific completes initial soil boring investigation in the Right-of-Way
February 19, 2008	MDEQ, MDAG, and Georgia-Pacific participate in a conference call to discuss the modified AOC schedule for completion of construction and establishment of institutional controls in the Right-of-Way
February 28, 2008	Georgia-Pacific submits Schedule for Completing Response Activities at the KHL OU
March 3, 2008	MDEQ signs the February 28, 2008 Schedule
March 19, 2008	Georgia-Pacific secures Quit Claim Deed from the City of Kalamazoo for its underlying fee interest in Parcel B
March 21, 2008	Georgia-Pacific submits Individual Application and Permit for Use of State Trunkline Right-of-Way to MDOT along with required fees for upcoming excavation in the Right-of-Way
April 2, 2008	MDOT issues permit for use of Right-of-Way to Georgia-Pacific
April 3, 2008	Georgia-Pacific submits Soil Boring Investigation Results and Residuals Removal Work Plan for KHL OU to MDEQ to provide a plan for excavation of identified residuals
April 7, 2008	Georgia-Pacific initiates excavation of residuals in Right-of-Way per April 3, 2008 Work Plan and installation of landfill gas cutoff trench (Trench D) - excavation completed on April 25, 2008, cutoff trench installation completed April 30, 2008
April 29, 2008	Georgia-Pacific submits Modified Schedule for Completing Response Activities at the KHL OU, requesting revisions to the deadlines for completion of the property transfer and remaining remedial work in Right-of-Way
April 30, 2008	MDEQ signs the April 29, 2008 Modified Schedule
May 9, 2008	MDEQ and Georgia-Pacific participate in a conference call to discuss remaining remedial work in Right-of-Way
May 15, 2008	Georgia-Pacific submits summary of May 9, 2008 conference call to MDEQ
May 19, 2008	Georgia-Pacific resumes remedial work in Right-of-Way pursuant to May 9, 2008 agreement
June 17, 2008	Georgia-Pacific acquires Quit Claim Deed from MDOT for Parcel A and a Relinquishment of Easement from MDOT for Parcel B, which, in combination with the Quit Claim Deed from the City of Kalamazoo for Parcel B, effectively complete the acquisition of Parcels A and B
June 19, 2008	Georgia-Pacific submits Summary of Ongoing Efforts in the KHL/MDOT Right-of-Way to MDEQ to describe remedial work completed in May and June 2008 and propose various options for addressing the remaining PCB-containing material in the Right-of-Way

See Notes on Page 3.

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Table 11-1 -- Summary of Key Communications and Events: June 2006 -- September 2011

Date	Description of Key Communication or Event
June 27, 2008	MDEQ, MDAG, and Georgia-Pacific participate in a conference call to discuss the options for additional work in the Right-of-Way; Georgia-Pacific proposes to acquire remaining Right-of-Way property from MDOT
June 27, 2008	MDOT and Georgia-Pacific meet at the KHL OU to discuss options for acquisition of remaining property in the Right-of-Way
July 9, 2008	Georgia-Pacific submits Further Modified Schedule for Completion of Response Activities at the KHL OU in Accordance with the AOC to MDEQ to address acquisition of remaining property and final remedial work
August 1, 2008	MDAG issues letter describing additional steps necessary to address final remedial work and property acquisition issues - specifically, additional sampling at the R-2 and R-5 areas to delineate the portion of the Right-of-Way with PCB-containing material above 4 mg/kg (MDEQ residential cleanup criterion)
August 4, 2008	Georgia-Pacific agrees with the process outlined in the August 1, 2008 letter
August 6, 2008	MDEQ and Georgia-Pacific meet at the KHL OU to discuss the delineation approach for the R-2 and R-5 areas in the Right-of-Way - Georgia-Pacific agreed to advance soil borings in the R-2 area and excavate test pits in the R-5 area
August 13, 2008	Georgia-Pacific initiates delineation and sampling efforts in the R-2 and R-5 areas in the Right-of-Way; work is completed on August 14, 2008
August 20, 2008	Georgia-Pacific submits Progress Report on Activities Implemented in Response to State Letter Dated August 1, 2008 to MDEQ
September 12, 2008	MDEQ, MDAG, and Georgia-Pacific participate in a conference call to discuss the R-2 and R-5 area delineation and sampling work, and agree to complete additional work in the R-5 area
September 15, 2008	Georgia-Pacific submits Work Plan for Additional Delineation and Sampling in the Right-of-Way at the KHL OU to MDEQ - specifically, the R-5 area
September 16, 2008	Georgia-Pacific submits Revised Work Plan for Additional Delineation and Sampling in the Right-of-Way at the KHL OU to MDEQ
September 17-18, 2008	Georgia-Pacific completes additional sampling in the R-5 area of the Right-of-Way
September 22, 2008	MDEQ and Georgia-Pacific participate in a conference call to discuss the September 17-18 sampling in the R-5 area of the Right-of-Way; Georgia-Pacific agrees to conduct additional delineation work to the west of the Right-of-Way
September 26, 2008	Georgia-Pacific advances additional soil borings west of the Right-of-Way and encounters no additional residuals; Georgia-Pacific notifies MDEQ of the results
October 30, 2008	Georgia-Pacific submits Summary of Additional Delineation Sampling at the R-2 and R-5 Areas to MDEQ and MDAG supporting the conclusion that sampling work in these areas is complete and providing a range of options for completing remedial work; the summary also included an update on the remaining property acquisition
December 11, 2008	MDEQ issues Response to the October 30, 2008 Report Regarding Summary of Additional Delineation Sampling at the R-2 and R-5 Areas
December 19, 2008	MDEQ and Georgia-Pacific participate in a conference call to discuss MDEQ's December 11, 2008 letter
December 26, 2008	Georgia-Pacific submits Evaluation of Scenarios and New Proposed Schedule for Completing Response Activities at the KHL OU to MDEQ; the report includes four scenarios for addressing PCB-containing materials in the Right-of-Way
January 9, 2009	Georgia-Pacific submits Revised Summary of Additional Delineation Sampling at the R-2 and R-5 Areas to MDEQ
January 12, 2009	MDEQ, MDAG, MDOT and Georgia-Pacific participate in a conference call to discuss the AOC schedule for completing the remaining remedial work at the KHL OU - MDOT clarifies that property acquisition is not a viable option, but will pursue a License Agreement as a mechanism for allowing PCB-containing material to remain in place with institutional controls
February 2, 2009	MDOT's Environmental Committee meets to discuss institutional controls in the Right-of-Way, and agrees to establish a License Agreement to allow the PCB-containing materials to remain in place
February 13, 2009	MDEQ provides comments on the January 9, 2009 submission
February 18, 2009	Georgia-Pacific submits the final Revised Summary of Additional Delineation Sampling at the R-2 and R-5 Areas to MDEQ - this report includes all results from the April, May, June, August, and September 2008 work and presents the final delineation in the R-2 and R-5 areas
March 6, 2009	Georgia-Pacific provides the final Revised Summary of Additional Delineation Sampling at the R-2 and R-5 Areas and the Evaluation of Scenarios and New Proposed Schedule for Completing Response Activities at the KHL OU to MDOT to facilitate its internal discussions regarding the License Agreement
April 2, 2009	MDEQ, MDAG, MDOT, and Georgia-Pacific meet to discuss the proposed License Agreement and implementation of Scenario 2 in the Right-of-Way, as described in the December 26, 2008 submission (leaving the PCB-impacted materials in place, covering the entire area with geotextile fabric and a 1-foot layer of clean backfill, and establishing institutional controls)
April 20 and 29, 2009	MDEQ, MDAG, MDOT, and Georgia-Pacific participate in follow-up conference calls to discuss the License Agreement and establishment of a deed notice to document potential health risks associated with materials remaining in the Right-of-Way and provide for future modifications (if necessary) to the License Agreement
May 14, 2009	Georgia-Pacific submits Financial Assurance Associated with MDOT License Agreement for Right-of-Way to MDOT for potential future remediation costs in the Right-of-Way
June 4, 2009	MDEQ and MDOT notify Georgia-Pacific that review of the License Agreement is ongoing
June 1, 2009	MDAG notifies Georgia-Pacific that they are drafting a Notice of Environmental Conditions Affecting Property Controlled by the MDOT (Notice)
September 2, 2009	Georgia-Pacific sends an e-mail to MDOT providing notification that an Irrevocable Letter of Credit in the amount of \$164,000 had been selected as the financial assurance for the License Agreement
September 21, 2009	MDOT transmits the draft Notice and License Agreement to Georgia-Pacific

See Notes on Page 3.

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Table 11-1 -- Summary of Key Communications and Events: June 2006 -- September 2011

Date	Description of Key Communication or Event
October - December, 2009	MDEQ, MDAG, MDOT, and Georgia-Pacific conduct a series of conference calls to discuss the revised AOC schedule to reflect continued developments relative to the scope and format of the institutional controls
December 22, 2009	MDEQ and MDAG provide a draft Schedule for Completing Response Activities at the KHL OU to Georgia-Pacific for review
December 29, 2009	Georgia-Pacific notifies MDEQ and MDAG of their acceptance of the December 22, 2009 schedule
January - March 2010	MDEQ, MDAG, MDOT, and Georgia-Pacific continue to review and edit the draft Notice and License Agreement
March 9, 2010	MDAG provides a further revised Schedule for Completing Response Activities at the KHL OU to Georgia-Pacific for review, along with a draft letter modification to the AOC for updates to the Restrictive Covenant format
March 11, 2010	Georgia-Pacific issues finalized Irrevocable Letter of Credit for the License Agreement in the Right-of-Way to MDOT
March 18, 2010	Georgia-Pacific notifies MDEQ of their acceptance of the Revised Schedule for Completing Response Activities at the KHL OU and the draft letter modification to the AOC
March 19, 2010	Georgia-Pacific transmits a signed Final Environmental License Agreement Associated with the MDOT R-O-W to MDOT - includes the final License Agreement and four attachments
July 26, 2010	MDOT issues the Permit for Use of State Trunkline R-O-W to Georgia-Pacific to conduct remedial work in the Right-of-Way required by the License Agreement
July 26, 2010	MDEQ transmits the Final Notice of Environmental Conditions Affecting Property Controlled by MDOT to Georgia-Pacific
July 28, 2010	Georgia-Pacific forwards the Final Notice of Environmental Conditions Affecting Property Controlled by MDOT to MDOT
August 6, 2010	Georgia-Pacific submits the Remedial Activities within the MDOT R-O-W Notification Letter to MDEQ providing notification of the proposed start date for conducting the final remedial activities in the Right-of-Way
August 30, 2010	Georgia-Pacific initiates remedial work activities in the Right-of-Way - work includes excavating soil from Parcel C, placing geotextile, backfilling the excavation with topsoil, and grading/seeding the topsoil
December 28, 2010	Georgia-Pacific submits the Completed Remedial Activities within the MDOT R-O-W Notification Letter to MDEQ and MDOT
December 29, 2010	MDEQ provides its concurrence that remedial activities in the Right-of-Way are complete
January 19, 2011	Georgia-Pacific submits Check for Recording Notice to MDOT to record the Notice with the Kalamazoo Register of Deeds
January 28, 2011	MDOT records Notice of Environmental Conditions Affecting Property Controlled by MDOT with the Kalamazoo Register of Deeds
March - May 2011	Georgia-Pacific procures permanent markers to install along the boundaries of Parcel C
May 11, 2011	Georgia-Pacific completes installation of the permanent markers along the boundary of Parcel C
September 9, 2011	Georgia-Pacific submits a revision to the modified schedule for completing deliverables/milestones in the Scope of Work under the AOC for the KHL OU

Notes:

1. AOC - Administrative Order on Consent.
2. Georgia-Pacific - Georgia-Pacific LLC.
3. KHL OU - King Highway Landfill Operable Unit.
4. MDAG - Michigan Department of the Attorney General.
5. MDEQ - Michigan Department of Environmental Quality.
6. MDOT - Michigan Department of Transportation.
7. PCBs - Polychlorinated Biphenyls.
8. R-O-W - Right-of-Way.
9. USEPA - United States Environmental Protection Agency.

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Table 11-2 -- PCB Sample Results from Remedial Work Activities Conducted within the MDOT R-O-W

Location ID	Date Collected	Sample Depth (feet bgs)	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total PCBs
EF-1	04/08/08	9	ND(0.066)	ND(0.066)	ND(0.066)	ND(0.066)	ND(0.066)	ND(0.066)	ND(0.066)	ND
EF-2	04/08/08	13-15	ND(0.073)	ND(0.073)	ND(0.073)	ND(0.073)	ND(0.073)	ND(0.073)	ND(0.073)	ND
EF-3	04/17/08	13-15	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND
EF-4	04/17/08	9	ND(0.056)	ND(0.056)	ND(0.056)	ND(0.056)	ND(0.056)	ND(0.056)	ND(0.056)	ND
EF-5	04/18/08	13	ND(0.054)	ND(0.054)	ND(0.054)	0.046 J	ND(0.054)	ND(0.054)	ND(0.054)	0.046 J
EF-6	04/18/08	9	ND(0.057)	ND(0.057)	ND(0.057)	0.18	0.044 J	ND(0.057)	ND(0.057)	0.22 J
EF-7	04/21/08	13-15	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND
EF-8	04/23/08	13	ND(0.055)	ND(0.055)	ND(0.055)	0.7	ND(0.055)	ND(0.055)	0.029 J	0.73 J
EF-9	04/23/08	13	ND(8.6)	ND(8.6)	ND(8.6)	120	ND(8.6)	ND(8.6)	ND(8.6)	120
EF-10	05/19/08	10	ND(0.064)	ND(0.064)	ND(0.064)	ND(0.064)	ND(0.064)	ND(0.064)	ND(0.064)	ND
EF-11	06/11/08	6	ND(0.059)	ND(0.059)	ND(0.059)	ND(0.059)	ND(0.059)	0.089	0.12	0.21
ESW-1	04/08/08	8	ND(0.054)	ND(0.054)	ND(0.054)	ND(0.054)	ND(0.054)	ND(0.054)	ND(0.054)	ND
ESW-2	04/08/08	6	ND(0.059)	ND(0.059)	ND(0.059)	ND(0.059)	ND(0.059)	ND(0.059)	0.13	0.13
ESW-3	04/08/08	5	ND(0.059)	ND(0.059)	ND(0.059)	0.14	ND(0.059)	0.14	0.11	0.39
ESW-4	04/09/08	4	ND(1.3)	ND(1.3)	ND(1.3)	9.9	2.9	ND(1.3)	ND(1.3)	13
ESW-5	04/18/08	5	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	0.17	0.22	0.19	0.58
ESW-6	04/24/08	5	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND
ESW-7	04/24/08	11	ND(0.054)	ND(0.054)	ND(0.054)	ND(0.054)	ND(0.054)	ND(0.054)	ND(0.054)	ND
ESW-8	04/24/08	6	ND(0.19)	ND(0.19)	ND(0.19)	2.4	ND(0.19)	0.14 J	ND(0.19)	2.5 J
ESW-9	05/19/08	4	ND(0.055)	ND(0.055)	ND(0.055)	ND(0.055)	ND(0.055)	0.047 J	ND(0.055)	0.047 J
ESW-10	06/11/08	3	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	0.33	0.33
ESW-11	06/11/08	3	ND(0.068)	ND(0.068)	ND(0.068)	ND(0.068)	0.26	0.2	0.081	0.54
R-5EF-1	05/23/08	9	ND(0.069)	ND(0.069)	ND(0.069)	ND(0.069)	ND(0.069)	ND(0.069)	ND(0.069)	ND
R-5EF-2	05/27/08	10	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND
R-5EF-3	05/27/08	8.5	ND(0.065)	ND(0.065)	ND(0.065)	ND(0.065)	ND(0.065)	ND(0.065)	ND(0.065)	ND
R-5ESW-1	05/27/08	5	ND(0.054)	ND(0.054)	ND(0.054)	ND(0.054)	ND(0.054)	ND(0.054)	ND(0.054)	ND
R-5WW-A	05/29/08	7	ND(7.1)	ND(7.1)	ND(7.1)	68	19	ND(7.1)	ND(7.1)	87
R-5SW-A	05/29/08	4	ND(1.5)	ND(1.5)	ND(1.5)	22	6.3	ND(1.5)	ND(1.5)	28
R-5EW-A	05/29/08	4	ND(6.6)	ND(6.6)	ND(6.6)	58	ND(6.6)	3.5 J	ND(6.6)	62 J
R-5WW-GRID	05/29/08	0-8	ND(0.56)	ND(0.56)	ND(0.56)	5.1	0.82	ND(0.56)	ND(0.56)	5.9
R-5SW-GRID	05/29/08	0-8	ND(0.11)	ND(0.11)	ND(0.11)	ND(0.11)	1.1	ND(0.11)	0.085 J	1.2 J
R-5EW-GRID	05/29/08	0-6.5	ND(0.27)	ND(0.27)	ND(0.27)	2.8	0.93	ND(0.27)	ND(0.27)	3.7
R-5WW-COMP-(0-4)	08/14/08	0-4	ND(0.17)	ND(0.17)	ND(0.17)	ND(0.17)	0.75	ND(0.17)	ND(0.17)	0.75
R-5WW-COMP-(4-8)	08/14/08	4-8	ND(1.2)	ND(1.2)	ND(1.2)	14	3.1	ND(1.2)	0.71 J	18 J
R-5WW-COMP-(0-10)	08/14/08	0-10	ND(1.2)	ND(1.2)	ND(1.2)	16	2.1	ND(1.2)	ND(1.2)	18
R-5SW-COMP-(0-4)	08/14/08	0-4	ND(0.055)	ND(0.055)	ND(0.055)	ND(0.055)	ND(0.055)	ND(0.055)	ND(0.055)	ND
R-5SW-COMP-(4-8)	08/14/08	4-8	ND(0.054)	ND(0.054)	ND(0.054)	ND(0.054)	0.08	ND(0.054)	0.029 J	0.11 J
R-5SW-COMP-(0-10)	08/14/08	0-10	ND(0.056)	ND(0.056)	ND(0.056)	0.13	0.064	ND(0.056)	0.032 J	0.23 J
R-5EW-COMP-(0-4)	08/14/08	0-4	ND(0.31)	ND(0.31)	ND(0.31)	1.4	1.5	ND(0.31)	ND(0.31)	2.9
R-5EW-COMP-(4-8)	08/14/08	4-8	ND(1.2)	ND(1.2)	ND(1.2)	9	3.6	ND(1.2)	ND(1.2)	13
R-5EW-COMP-(0-10)	08/14/08	0-10	ND(2.9)	ND(2.9)	ND(2.9)	10	3.4	ND(2.9)	ND(2.9)	13
TP-7-1	09/18/08	9-10	ND(0.065)	ND(0.065)	ND(0.065)	ND(0.065)	ND(0.065)	ND(0.065)	ND(0.065)	ND
TP-7-2	09/18/08	5.5	ND(1.8)	ND(1.8)	ND(1.8)	13	ND(1.8)	0.95 J	ND(1.8)	14 J
TP-7-3	09/18/08	5.5	ND(0.066)	ND(0.066)	ND(0.066)	ND(0.066)	ND(0.066)	ND(0.066)	ND(0.066)	ND
TP-7-COMP	09/18/08	--	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	0.084	ND(0.057)	ND(0.057)	0.084

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Table 11-2 -- PCB Sample Results from Remedial Work Activities Conducted within the MDOT R-O-W

Location ID	Date Collected	Sample Depth (feet bgs)	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total PCBs
TP-8	09/18/08	5	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	ND
TP-9-1	09/18/08	3	ND(0.56)	ND(0.56)	ND(0.56)	5.5	1.5	ND(0.56)	ND(0.56)	7
TP-9-2	09/18/08	3.5	ND(0.68)	ND(0.68)	ND(0.68)	63	ND(0.68)	ND(0.68)	ND(0.68)	63
TP-9-3	09/18/08	10	ND(0.054)	ND(0.054)	ND(0.054)	0.069	ND(0.054)	ND(0.054)	ND(0.054)	0.069
SB-1	02/19/08	4 - 12	ND [7.7]	ND [7.7]	ND [7.7]	110	ND [7.7]	ND [7.7]	ND [7.7]	110
SB-2	02/19/08	4 - 12	ND [8.6]	ND [8.6]	ND [8.6]	90	ND [8.6]	ND [8.6]	ND [8.6]	90
SB-7	02/19/08	4 - 12	ND [16]	ND [16]	ND [16]	170	ND [16]	ND [16]	ND [16]	170
SB-9	02/19/08	4 - 8	ND [3.8]	ND [3.8]	ND [3.8]	33	18	ND [3.8]	2.7 J	53.7 J
SB-12	02/19/08	4 - 8	ND [15]	ND [15]	ND [15]	160	ND [15]	ND [15]	ND [15]	160
SB-14	02/20/08	4 - 12	ND [7.3]	ND [7.3]	ND [7.3]	110	ND [7.3]	ND [7.3]	4.8 J	115 J
SB-17	05/21/08	4	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	0.050 J	0.051 J	0.040 J	0.14 J
SB-18	05/21/08	4	ND(0.61)	ND(0.61)	ND(0.61)	8.8	2.4	ND(0.61)	1.1	12
SB-24	08/14/08	8-12	ND(0.053)	ND(0.053)	ND(0.053)	0.15	0.099	0.05 J	0.077	0.38 J
SB-25	08/14/08	8-12	ND(0.052)	ND(0.052)	ND(0.052)	ND(0.052)	0.13	ND(0.052)	0.037 J	0.17 J
SB-26	08/14/08	12-16	ND(0.056)	ND(0.056)	ND(0.056)	ND(0.056)	ND(0.056)	ND(0.056)	ND(0.056)	ND
SB-27	08/14/08	8-12	ND(3.7)	ND(3.7)	ND(3.7)	41	3.8	ND(3.7)	ND(3.7)	45
SB-28	08/14/08	8-12	ND(0.3)	ND(0.3)	ND(0.3)	1.6	0.51	ND(0.3)	ND(0.3)	2.1
SB-29	08/14/08	8-12	ND(0.53)	ND(0.53)	ND(0.53)	3.4	ND(0.53)	ND(0.53)	ND(0.53)	3.4
SB-30	08/14/08	8-12	ND(0.053)	ND(0.053)	ND(0.053)	0.75	ND(0.053)	ND(0.053)	ND(0.053)	0.75
SB-31	08/14/08	12-16	ND(0.059)	ND(0.059)	ND(0.059)	0.057 J	ND(0.059)	ND(0.059)	ND(0.059)	0.057 J
SB-32	08/14/08	8-12	ND(0.061)	ND(0.061)	ND(0.061)	0.067	ND(0.061)	ND(0.061)	ND(0.061)	0.067
SB-33	08/14/08	8-12	ND(0.056)	ND(0.056)	ND(0.056)	ND(0.056)	ND(0.056)	ND(0.056)	ND(0.056)	ND
SB-34(0-4)	09/17/08	0-4	ND(0.061)	ND(0.061)	ND(0.061)	ND(0.061)	0.12	0.11	0.042 J	0.27 J
SB-34(4-8)	09/17/08	4-8	ND(0.57)	ND(0.57)	ND(0.57)	4.8	2	ND(0.57)	ND(0.57)	6.8
SB-34(8-12)	09/17/08	8-12	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND
SB-35(0-4)	09/17/08	0-4	ND(0.055)	ND(0.055)	ND(0.055)	ND(0.055)	0.22	ND(0.055)	ND(0.055)	0.22
SB-35(4-8)	09/17/08	4-8	ND(0.055)	ND(0.055)	ND(0.055)	6.6	0.74	ND(0.055)	ND(0.055)	7.3
SB-35(8-12)	09/17/08	8-12	ND(0.061)	ND(0.061)	ND(0.061)	ND(0.061)	ND(0.061)	ND(0.061)	ND(0.061)	ND
SB-36(0-4)	09/17/08	0-4	ND(0.11)	ND(0.11)	ND(0.11)	ND(0.11)	1.5	ND(0.11)	0.15	1.7
SB-36(4-8)	09/17/08	4-8	ND(0.27)	ND(0.27)	ND(0.27)	1.7	0.71	ND(0.27)	ND(0.27)	2.4
SB-36(8-12)	09/17/08	8-12	ND(0.066)	ND(0.066)	ND(0.066)	ND(0.066)	ND(0.066)	ND(0.066)	ND(0.066)	ND
SB-37(0-4)	09/17/08	0-4	ND(0.053)	ND(0.053)	ND(0.053)	ND(0.053)	ND(0.053)	ND(0.053)	0.08	0.08
SB-37(4-8)	09/17/08	4-8	ND(0.056)	ND(0.056)	ND(0.056)	ND(0.056)	ND(0.056)	ND(0.056)	0.035 J	0.035 J
SB-37(8-12)	09/17/08	8-12	ND(0.062)	ND(0.062)	ND(0.062)	ND(0.062)	ND(0.062)	ND(0.062)	ND(0.062)	ND
SB-38(0-4)	09/18/08	0-4	ND(0.057)	ND(0.057)	ND(0.057)	0.27	ND(0.057)	0.52	0.16	0.95
SB-38(4-6)	09/18/08	4-6	ND(6.8)	ND(6.8)	ND(6.8)	70	ND(6.8)	ND(6.8)	ND(6.8)	70
SB-38(6-8)	09/18/08	6-8	ND(3.2)	ND(3.2)	ND(3.2)	47	ND(3.2)	ND(3.2)	ND(3.2)	47
SB-38(8-12)	09/18/08	8-12	ND(0.074)	ND(0.074)	ND(0.074)	0.09	ND(0.074)	ND(0.074)	ND(0.074)	0.09
SB-39(0-4)	09/18/08	0-4	ND(0.054)	ND(0.054)	ND(0.054)	ND(0.054)	ND(0.054)	0.033 J	ND(0.054)	0.033 J
SB-39(4-8)	09/18/08	4-8	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	0.077	0.077
SB-39(8-12)	09/18/08	8-12	ND(0.068)	ND(0.068)	ND(0.068)	ND(0.068)	ND(0.068)	ND(0.068)	ND(0.068)	ND
SB-40(0-4)	09/18/08	0-4	ND(0.056)	ND(0.056)	ND(0.056)	ND(0.056)	ND(0.056)	0.26	0.46	0.72
SB-40(4-8)	09/18/08	4-8	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND
SB-40(0-4)	09/18/08	0-4	ND(0.056)	ND(0.056)	ND(0.056)	ND(0.056)	ND(0.056)	0.26	0.46	0.72
SB-40(4-8)	09/18/08	4-8	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND

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Location ID	Date Collected	Sample Depth (feet bgs)	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total PCBs
SB-40(8-12)	09/18/08	8-12	ND(0.068)	ND(0.068)	ND(0.068)	ND(0.068)	ND(0.068)	ND(0.068)	ND(0.068)	ND
SB-41(0-4)	09/18/08	0-4	ND(1.2)	ND(1.2)	ND(1.2)	19	ND(1.2)	ND(1.2)	ND(1.2)	19
SB-41(4-8)	09/18/08	4-8	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	ND
SB-41(8-12)	09/18/08	8-12	ND(0.062)	ND(0.062)	ND(0.062)	ND(0.062)	ND(0.062)	ND(0.062)	ND(0.062)	ND
SB-42(0-4)	09/18/08	0-4	ND(1.1)	ND(1.1)	ND(1.1)	ND(1.1)	1.3	ND(1.1)	0.099 J	1.4 J
SB-42(4-8)	09/18/08	4-8	ND(1.8)	ND(1.8)	ND(1.8)	27	ND(1.8)	ND(1.8)	ND(1.8)	27
SB-42(8-12)	09/18/08	8-12	ND(0.055)	ND(0.055)	ND(0.055)	ND(0.055)	ND(0.055)	ND(0.055)	ND(0.055)	ND
SB-43(0-4)	09/18/08	0-4	ND(0.057)	ND(0.057)	ND(0.057)	ND(0.057)	7.1	ND(0.057)	0.62	7.7
SB-43(4-8)	09/18/08	4-8	ND(0.053)	ND(0.053)	ND(0.053)	ND(0.053)	ND(0.053)	ND(0.053)	ND(0.053)	ND
SB-43(8-12)	09/18/08	8-12	ND(0.055)	ND(0.055)	ND(0.055)	ND(0.055)	ND(0.055)	ND(0.055)	ND(0.055)	ND
SB-44(0-4)	09/18/08	0-4	ND(0.053)	ND(0.053)	ND(0.053)	ND(0.053)	ND(0.053)	ND(0.053)	ND(0.053)	ND
SB-44(4-8)	09/18/08	4-8	ND(2.6)	ND(2.6)	ND(2.6)	2.2	ND(2.6)	ND(2.6)	ND(2.6)	2.2
SB-44(8-12)	09/18/08	8-12	ND(1.1)	ND(1.1)	ND(1.1)	0.98	0.19	ND(1.1)	ND(1.1)	1.2
SB-45(0-4)	09/18/08	0-4	ND(0.054)	ND(0.054)	ND(0.054)	ND(0.054)	ND(0.054)	ND(0.054)	ND(0.054)	ND
SB-45(4-8)	09/18/08	4-8	ND(0.055)	ND(0.055)	ND(0.055)	ND(0.055)	ND(0.055)	ND(0.055)	ND(0.055)	ND
SB-45(8-12)	09/18/08	8-12	ND(0.059)	ND(0.059)	ND(0.059)	ND(0.059)	ND(0.059)	ND(0.059)	ND(0.059)	ND
SB-46(0-4)	09/18/08	0-4	ND(0.052)	ND(0.052)	ND(0.052)	ND(0.052)	ND(0.052)	0.055	0.075	0.13
SB-46(4-8)	09/18/08	4-8	ND(0.054)	ND(0.054)	ND(0.054)	ND(0.054)	ND(0.054)	ND(0.054)	0.04 J	0.04 J
SB-46(8-12)	09/18/08	8-12	ND(0.058)	ND(0.058)	ND(0.058)	0.1	ND(0.058)	0.37	ND(0.058)	0.47
SB-47(0-4)	09/26/08	0-4	ND [0.055]	ND [0.055]	ND [0.055]	ND [0.055]	ND [0.055]	ND [0.055]	ND [0.055]	ND
SB-47(4-8)	09/26/08	4-8	ND [0.054]	ND [0.054]	ND [0.054]	ND [0.054]	ND [0.054]	ND [0.054]	ND [0.054]	ND
SB-47(8-12)	09/26/08	8-12	ND [0.055]	ND [0.055]	ND [0.055]	ND [0.055]	ND [0.055]	ND [0.055]	ND [0.055]	ND
SB-48 (0-4)	09/26/08	0-4	ND [0.053]	ND [0.053]	ND [0.053]	ND [0.053]	ND [0.053]	ND [0.053]	ND [0.053]	ND
SB-48 (4-8)	09/26/08	4-8	ND [0.054]	ND [0.054]	ND [0.054]	ND [0.054]	ND [0.054]	ND [0.054]	ND [0.054]	ND
SB-48 (8-12)	09/26/08	8-12	ND [0.054]	ND [0.054]	ND [0.054]	ND [0.054]	ND [0.054]	ND [0.054]	ND [0.054]	ND
SB-49(0-4)	09/26/08	0-4	ND [0.053]	ND [0.053]	ND [0.053]	ND [0.053]	ND [0.053]	ND [0.053]	0.13	0.13
SB-49(4-8)	09/26/08	4-8	ND [0.054]	ND [0.054]	ND [0.054]	ND [0.054]	ND [0.054]	ND [0.054]	ND [0.054]	ND
SB-49(8-12)	09/26/08	8-12	ND [0.063]	ND [0.063]	ND [0.063]	ND [0.063]	ND [0.063]	ND [0.063]	ND [0.063]	ND
SB-50(0-4)	09/26/08	0-4	ND [0.053]	ND [0.053]	ND [0.053]	ND [0.053]	ND [0.053]	ND [0.053]	0.03 J	0.03 J
SB-50(4-8)	09/26/08	4-8	ND [0.054]	ND [0.054]	ND [0.054]	ND [0.054]	ND [0.054]	ND [0.054]	ND [0.054]	ND
SB-50(8-12)	09/26/08	8-12	ND [0.075]	ND [0.075]	ND [0.075]	ND [0.075]	ND [0.075]	ND [0.075]	ND [0.075]	ND

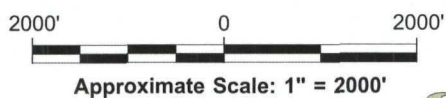
Notes:

1. Samples were collected by ARCADIS and submitted to TestAmerica for PCB analysis.
2. ND - Analyte was not detected above the detection limit. The number in parenthesis is the associated detection limit.
3. J - Data qualifier indicates estimated value.
4. EF - Designates sample collected from excavation floor.
5. ESW - Designates sample collected from excavation side wall.
6. SB - Designates sample collected from soil boring.
7. WW - Designates sample collected from excavation western side wall.
8. SW - Designates sample collected from excavation southern side wall.
9. EW - Designates sample collected from excavation eastern side wall.
10. (0-4), (4-8), (0-10) - Designates composite sample grid depth interval.

Figures



REFERENCE: Base Map Source: USGS 7.5 Min. Topo. Quad., Kalamazoo, MI (1967, Photorevised 1973).



FINAL

AREA LOCATION

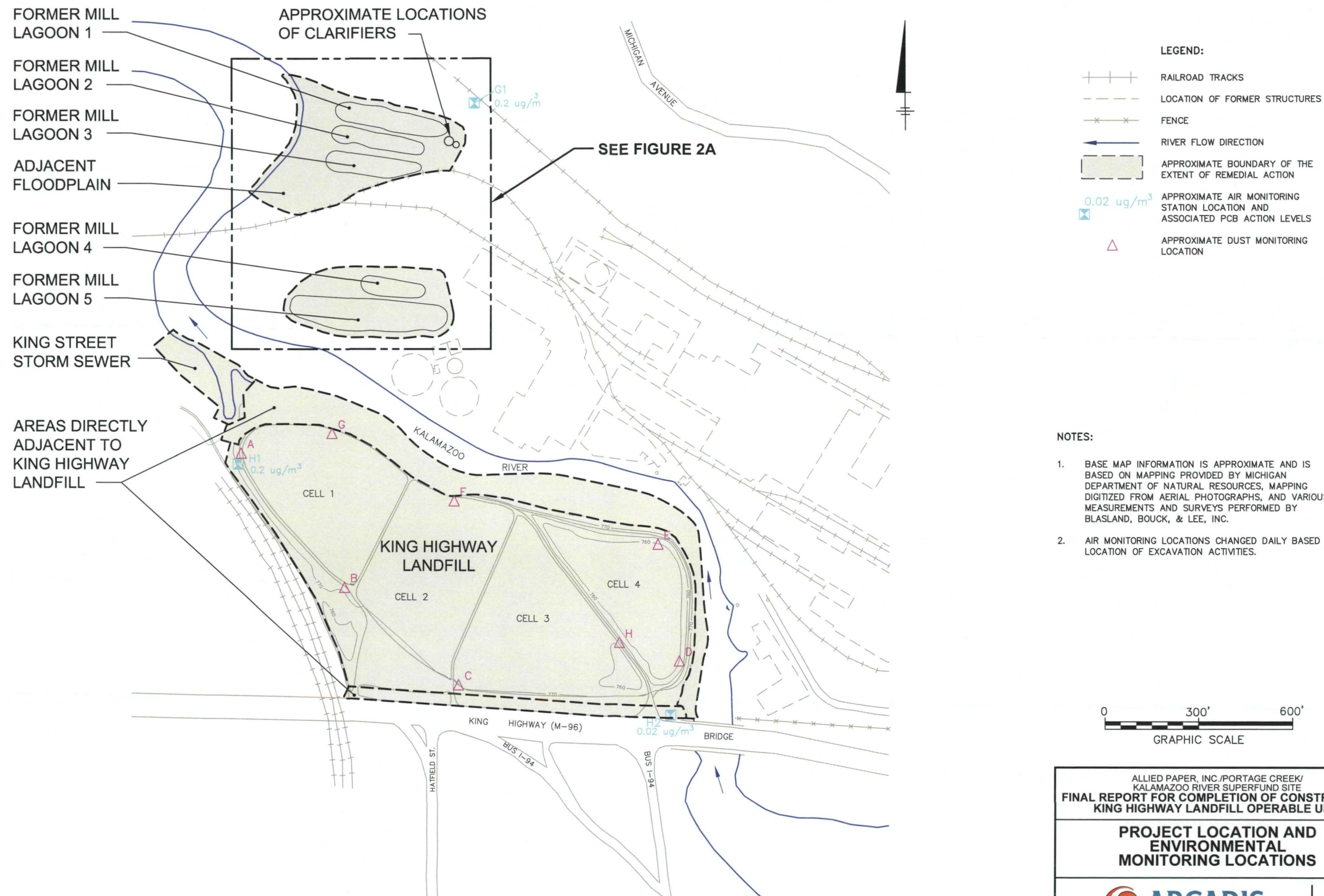
ALLIED PAPER, INC./PORTAGE CREEK
KALAMAZOO RIVER SUPERFUND SITE
FINAL REPORT FOR COMPLETION OF CONSTRUCTION
KING HIGHWAY LANDFILL OPERABLE UNIT

SITE LOCATION MAP



FIGURE

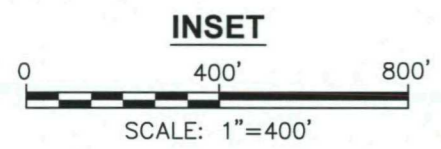
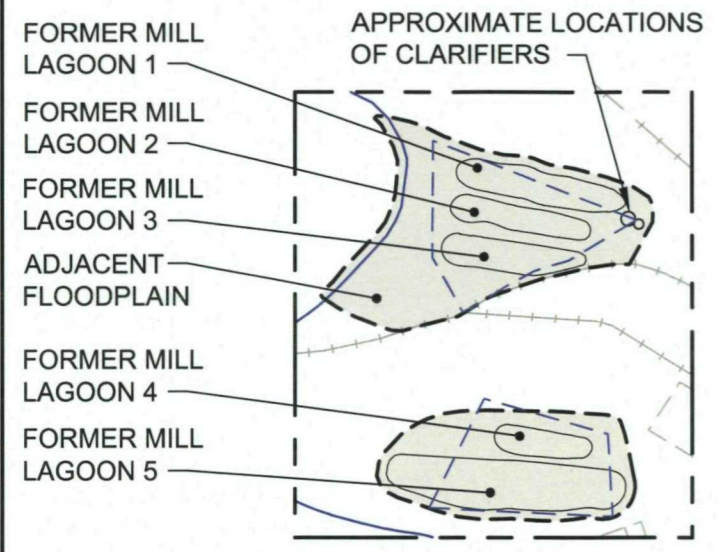
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FINAL

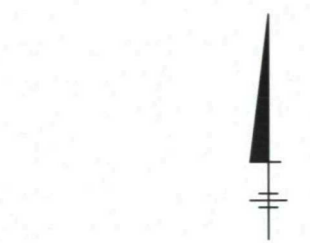
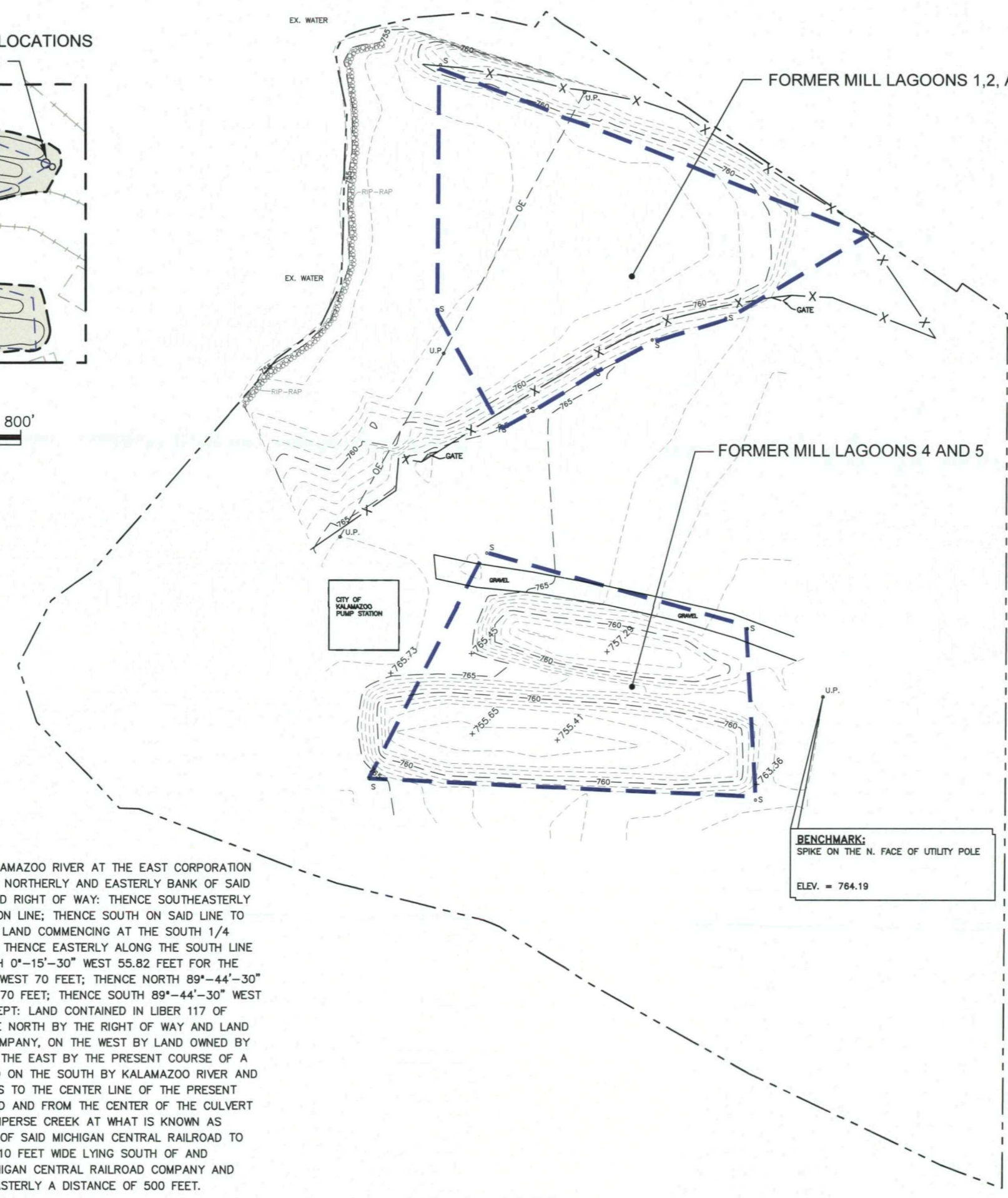


CITY: SYRACUSE DIV: GROUP ENV: CAD DB: S. KOWALCZYK L. ROSENALIER L. FORAKER LD: PIC: D. COWAN PK: D. PENNIMAN TM: D. PENNIMAN LYN: ON+ OFF+ REF+
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XREFS: 64583X00 64583X05
IMAGES: PROJECTNAME: -----



PARCEL DESCRIPTION:

BEGINNING ON THE NORTHERLY BANK OF THE KALAMAZOO RIVER AT THE EAST CORPORATION LINE; THENCE WESTERLY AND NORTHERLY ON THE NORTHERLY AND EASTERLY BANK OF SAID RIVER TO THE SOUTHERLY LINE OF MCRR RAILROAD RIGHT OF WAY; THENCE SOUTHEASTERLY ON SAID RIGHT OF WAY TO THE EAST CORPORATION LINE; THENCE SOUTH ON SAID LINE TO THE PLACE OF BEGINNING. EXCEPT, A PARCEL OF LAND COMMENCING AT THE SOUTH 1/4 POST OF SECTION 14, T. 2 S., R. 11 W., RUNNING THENCE EASTERLY ALONG THE SOUTH LINE OF SAID SECTION 14, 643.17 FEET; THENCE NORTH 0°-15'-30" WEST 55.82 FEET FOR THE PLACE OF BEGINNING; THENCE NORTH 0°-15'-30" WEST 70 FEET; THENCE NORTH 89°-44'-30" EAST 70 FEET; THENCE SOUTH 0°-15'-30" EAST 70 FEET; THENCE SOUTH 89°-44'-30" WEST 70 FEET TO THE PLACE OF BEGINNING. ALSO EXCEPT: LAND CONTAINED IN LIBER 117 OF DEEDS ON PAGE 359 AND DESCRIBED AS: ON THE NORTH BY THE RIGHT OF WAY AND LAND OWNED AND OCCUPIED BY MICHIGAN RAILROAD COMPANY, ON THE WEST BY LAND OWNED BY SAID MICHIGAN CENTRAL RAILROAD COMPANY, ON THE EAST BY THE PRESENT COURSE OF A SMALL STREAM KNOWN AS "AMPERSE CREEK" AND ON THE SOUTH BY KALAMAZOO RIVER AND ON THE EAST BY A LINE DROWN AT RIGHT ANGLES TO THE CENTER LINE OF THE PRESENT MAIN TRACK OF SAID MICHIGAN CENTRAL RAILROAD AND FROM THE CENTER OF THE CULVERT OF SOLD RAILROAD AT THAT POINT OVER SAID AMPERSE CREEK AT WHAT IS KNOWN AS STATION 7505+55 OF THE MAIN LINE STATIONING OF SAID MICHIGAN CENTRAL RAILROAD TO SAID KALAMAZOO RIVER. ALSO A STRIP OF LAND 10 FEET WIDE LYING SOUTH OF AND ADJOINING THE SAID RIGHT OF WAY OF SOLD MICHIGAN CENTRAL RAILROAD COMPANY AND RUNNING FROM THE CENTER OF SOLD CULVERT EASTERLY A DISTANCE OF 500 FEET.



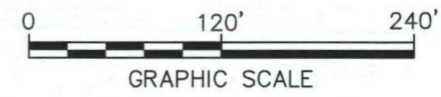
- LEGEND:
- PROPOSED RESTRICTED AREA FOR THE RESTRICTIVE COVENANT (REFER TO PARCEL DESCRIPTION)
 - HISTORIC RESTRICTED AREAS DEFINED IN THE AOC
 - o S SURVEY IRON
 - 760 --- FINAL AS-BUILT INDEX CONTOUR
 - FINAL AS-BUILT INTERMEDIATE CONTOUR
 - X --- FENCE
 - U.P. o UTILITY POLE

NOTES:

1. BASE MAP INFORMATION OBTAINED FROM CADD DRAWING FILE DEVELOPED BY RMT, INC., ANN ARBOR, MICHIGAN (CADD FILE: L1630SU01.DWG; AS-BUILT SURVEY; AUGUST 21, 2000).
2. AS-BUILT CONTOUR ELEVATIONS ARE SHOWN AND ARE BASED ON A FIELD SURVEY BY ATWELL-HICKS, INC., DATED 9/27/00 WITH REVISIONS DATED 10/23/00, 12/21/01, 12/10/02, AND 7/24/03.

BENCHMARK:
SPIKE ON THE N. FACE OF UTILITY POLE

ELEV. = 764.19



ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
**FINAL REPORT FOR COMPLETION OF CONSTRUCTION
KING HIGHWAY LANDFILL OPERABLE UNIT**

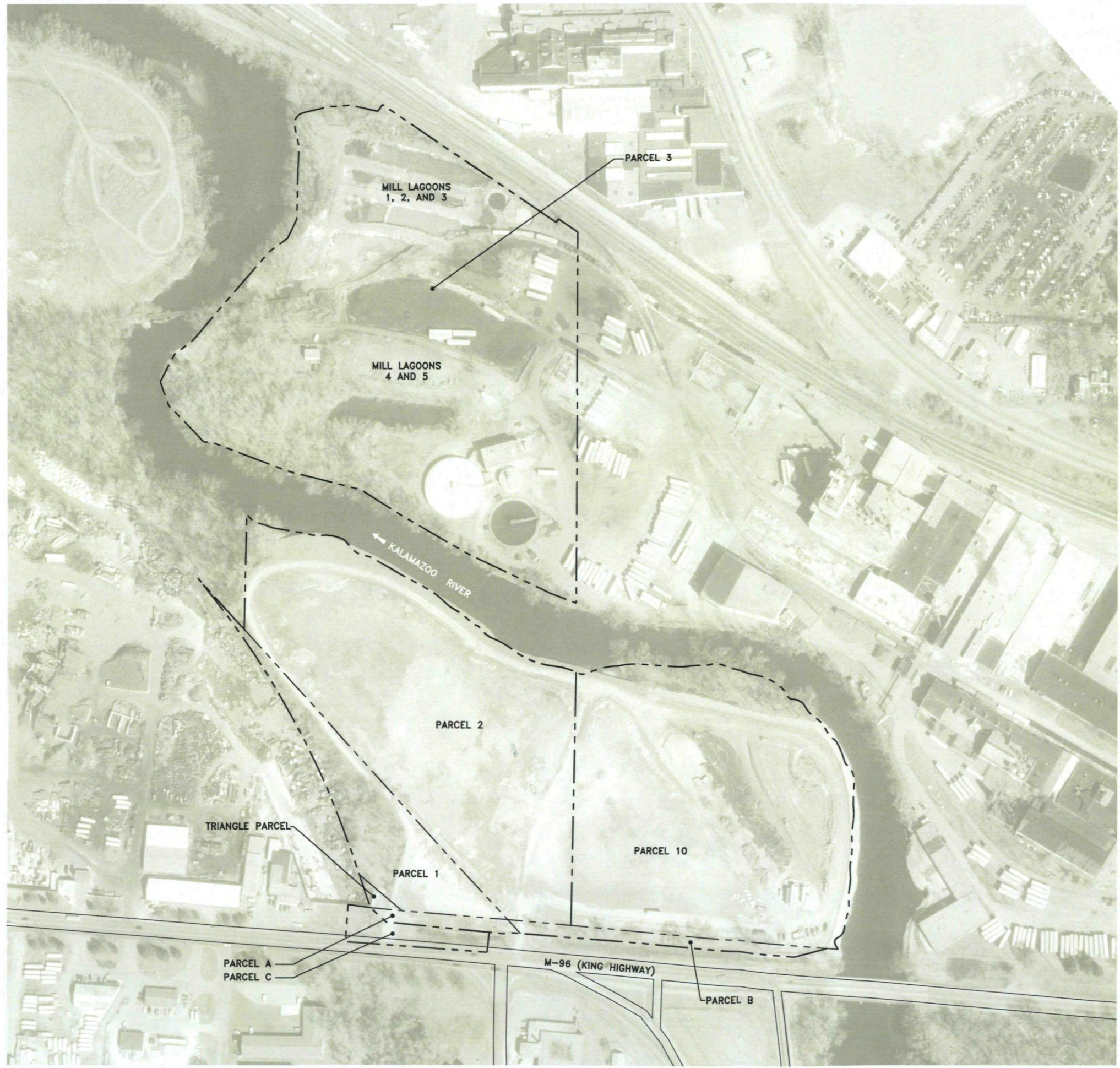
MILL LAGOON SITE PLAN

ARCADIS

FIGURE
2A

FINAL

CITY: SYRACUSE DIV: GROUP ENV: CAD DB: G. STOWELL L. POSEMAUER L. FORAKER LD. PIC: D. COWIN PM: D. PENNIMAN TM: D. PENNIMAN LYN: ON: OFF: REF: G:\ENV\CAD\SYRACUSE\ENV\ACT\B006483000\DWG\COMPLETION\483802.DWG LAYOUT: 3 SAVED: 4/17/2013 11:13 AM ACADVER: 18.1 S (LMS TECH) PAGESETUP: C:\B-PDF PLOTSTYLE\TABLE: PLT\FULL.CTB PLOTTED: 4/17/2013 11:13 AM BY: FORAKER, LYDIA
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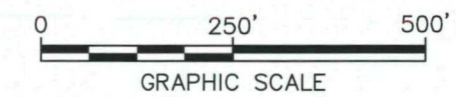


LEGEND:

--- PARCEL BOUNDARY

NOTES:

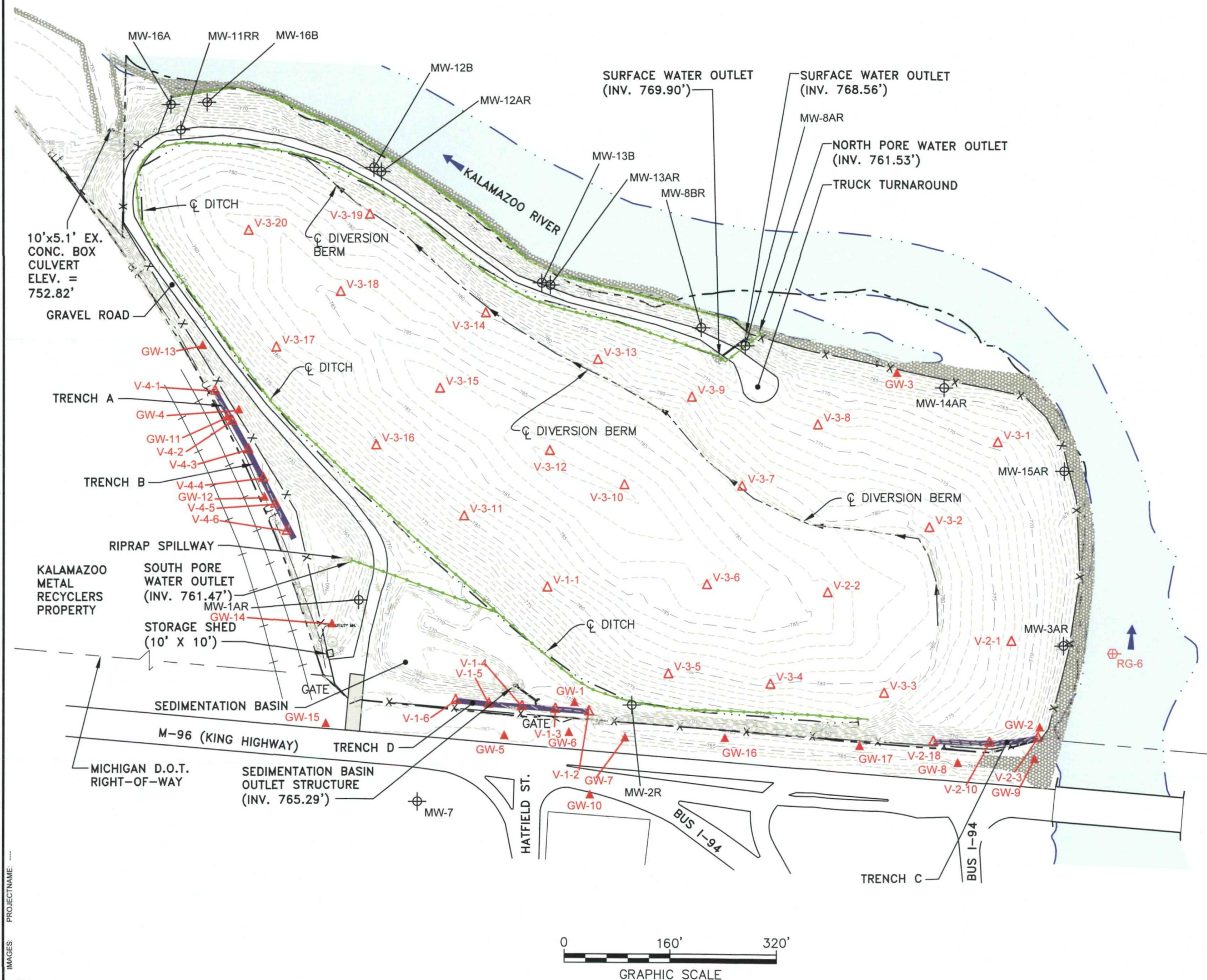
1. PARCEL NOS. 1, 2, AND 10 CORRESPOND TO CITY OF KALAMAZOO AND TOWNSHIP OF KALAMAZOO TAX PARCEL ID NOS. 06-23-218-003, 06-23-208-002, AND 06-23-240-030. PARCELS 1, 2, AND 10 WERE DEFINED IN THE CERTIFIED SURVEY AND LEGAL DESCRIPTION PREPARED BY LICENSED LAND SURVEYOR PREIN & NEWHOF ON JULY 6, 2011.
2. THE "TRIANGLE PARCEL" WAS PURCHASED BY GEORGIA-PACIFIC IN EARLY 2006 FROM THE MICHIGAN DEPARTMENT OF TRANSPORTATION. THE TRIANGLE PARCEL WAS DEFINED IN THE CERTIFIED SURVEY AND LEGAL DESCRIPTION PREPARED BY LICENSED LAND SURVEYOR PREIN & NEWHOF ON JULY 6, 2011.
3. PARCELS A AND B WERE DEFINED IN CERTIFIED SURVEYS AND LEGAL DESCRIPTIONS PREPARED BY LICENSED LAND SURVEYOR PREIN & NEWHOF ON JULY 6, 2011. IN SUMMER OF 2008, GEORGIA-PACIFIC PURCHASED PARCEL A FROM THE MICHIGAN DEPARTMENT OF TRANSPORTATION AND ALSO PURCHASED PARCEL B FROM THE CITY OF KALAMAZOO.
4. PARCEL C WAS DEFINED IN THE CERTIFIED SURVEY AND LEGAL DESCRIPTION PREPARED BY LICENSED LAND SURVEYOR PREIN & NEWHOF ON DECEMBER 28, 2009. WHICH WAS RECORDED IN THE NOTICE OF ENVIRONMENTAL CONDITIONS AFFECTING PROPERTY CONTROLLED BY THE MICHIGAN DEPARTMENT OF TRANSPORTATION WITH THE KALAMAZOO COUNTY REGISTER OF DEEDS ON JANUARY 28, 2011.
5. PARCEL 3 (CONTAINING MILL LAGOONS 1, 2, 3, 4, AND 5) WAS DEFINED IN THE ALTA/ACSM LAND TITLE SURVEY PREPARED BY LICENSED LAND SURVEYOR PREIN & NEWHOF ON MARCH 11, 2003.
6. AERIAL IMAGE DERIVED FROM ORTHOPHOTOGRAPHIC DATA BY AIR LAND SURVEYS, INC., FLOWN 4/24/99.



ALLIED PAPER, INC./PORTAGE CREEK/ KALAMAZOO RIVER SUPERFUND SITE FINAL REPORT FOR COMPLETION OF CONSTRUCTION KING HIGHWAY LANDFILL OPERABLE UNIT	
EXISTING CONTROL BOUNDARIES	
	FIGURE 3

FINAL

CITY: SYRACUSE DIV: GROUP: ENV: CAD: DB: G. STOWELL L. POSENAUER L. FORAKER LD: PIC: D. COWIN PM: D. PENNIMAN TM: D. PENNIMAN LYN: ON: "OFF-REF"
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PROJECT NAME: KALAMAZOO RIVER SUPERFUND SITE
XREFS: 64583X00 64583X01
IMAGES:



- LEGEND:**
- APPROXIMATE OUTSIDE PARCEL BOUNDARY
 - . - . - DITCH LINE
 - ABANDONED RAILROAD
 - SHEETPILE WALL
 - ACCESS ROAD
 - RIPRAP
 - CULVERT PIPE
 - FINAL AS-BUILT INDEX CONTOUR
 - FINAL AS-BUILT INTERMEDIATE CONTOUR
 - X - SECURITY FENCE
 - PORE WATER COLLECTION PIPE
 - PORE WATER DRAIN
 - APPROXIMATE WATER EDGE
 - V-1-2 GAS VENTS
 - LANDFILL GAS CUTOFF TRENCH
 - FLOW DIRECTION
 - MW-14 MONITORING WELL
 - RG-3 FORMER RIVER GAUGE STATION (NO LONGER IN USE)
 - GW-2 LOCATION OF GAS MONITORING PROBES

- NOTES:**
1. BASE MAP INFORMATION OBTAINED FROM CADD DRAWING FILE DEVELOPED BY RMT, INC., ANN ARBOR, MICHIGAN (CADD FILE: L1630SU01.DWG AS-BUILT SURVEY; 8/21/00).
 2. FINAL AS-BUILT CONTOUR ELEVATIONS ARE SHOWN AND ARE BASED ON A FIELD SURVEY BY ATWELL-HICKS, INC., DATED 9/27/00 WITH REVISIONS DATED 10/23/00, 12/21/01, 12/10/02, AND 7/24/03.
 3. ELEVATIONS ARE BASED ON NGVD OF 1929 (MSL).
 4. PROPERTY SURVEY PERFORMED BY WILKINS & WHEATON ENGINEERING CO., INC., ON 7/1/96.
 5. TOPOGRAPHIC CONTOUR INTERVAL IS 1 FOOT.
 6. LOCATIONS OF GW-5, GW-6, GW-7, GW-8, GW-9, AND GW-10 ARE BASED ON A FIELD SURVEY BY TERRA CONTRACTING LLC, DATED 9/23/05.
 7. LOCATION OF GW-11 IS BASED ON A FIELD SURVEY BY TERRA CONTRACTING LLC, DATED 1/11/06.
 8. LOCATIONS OF RG-6, V-4-4, V-4-5, AND V-4-6 ARE BASED ON A FIELD SURVEY BY TERRA CONTRACTING LLC, DATED 6/7/06.
 9. LOCATIONS OF V-1-2 THROUGH V-1-6, V-2-3, V-2-10, AND V-2-18 ARE BASED ON MULTIPLE FIELD SURVEYS CONDUCTED BY TERRA CONTRACTING, LLC. IN APRIL 2008. GAS VENTS V-2-4 THROUGH V-2-9, AND V-2-11 THROUGH V-2-17 ARE NOT SHOWN FOR CLARITY PURPOSES (THESE VENTS ARE LOCATED ALONG TRENCH C).
 10. LOCATION OF GW-12 IS APPROXIMATE.
 11. LOCATIONS OF GW-13 THROUGH GW-17 BASED ON FIELD SURVEY CONDUCTED BY PREIN & NEUHOFF ON 11/1/11.

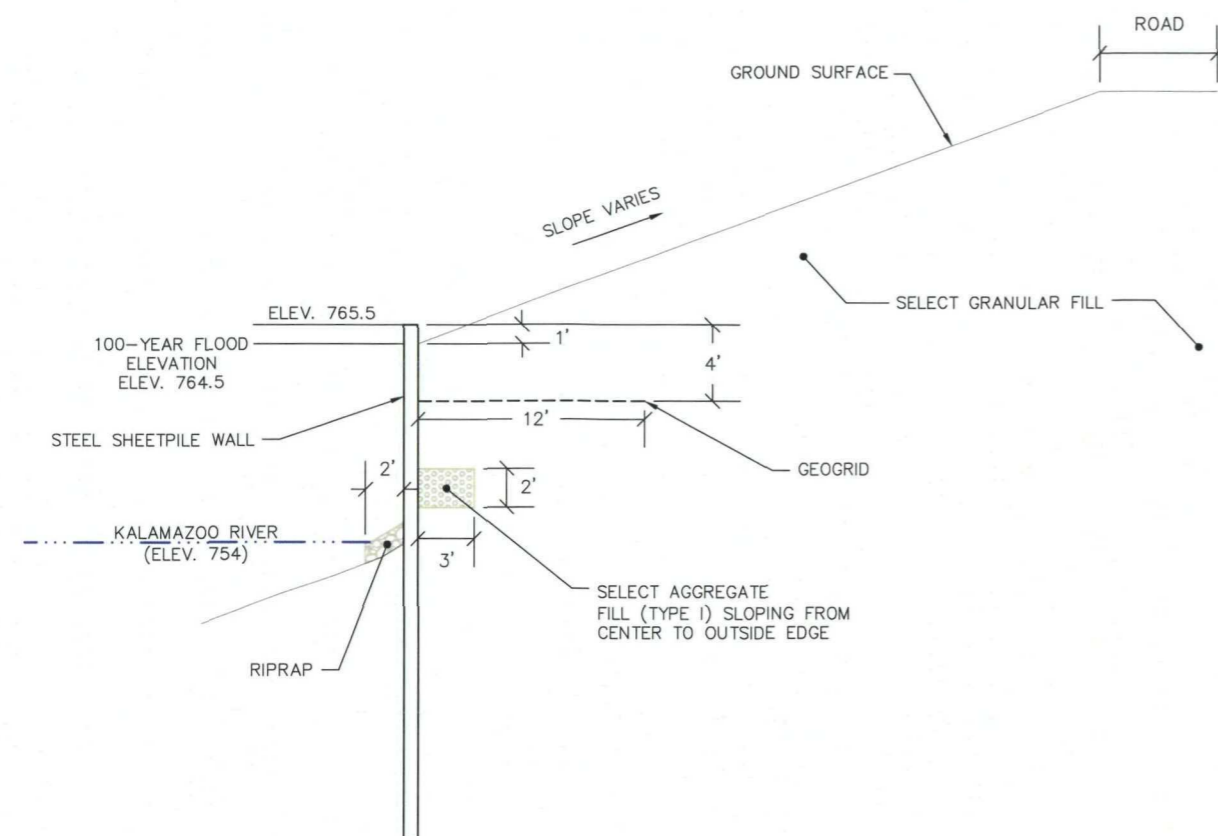
ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
**FINAL REPORT FOR COMPLETION OF CONSTRUCTION
KING HIGHWAY LANDFILL OPERABLE UNIT**

KHL SITE PLAN

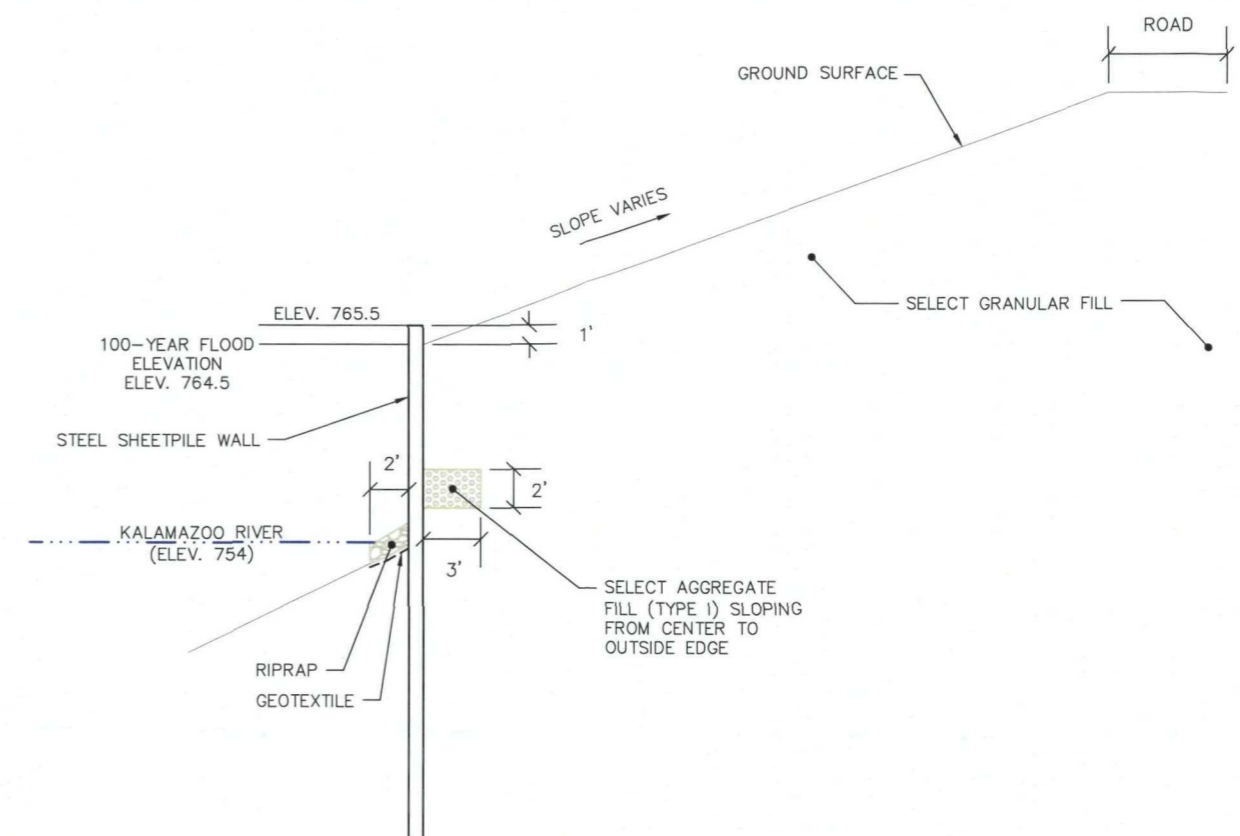
ARCADIS

FIGURE
4

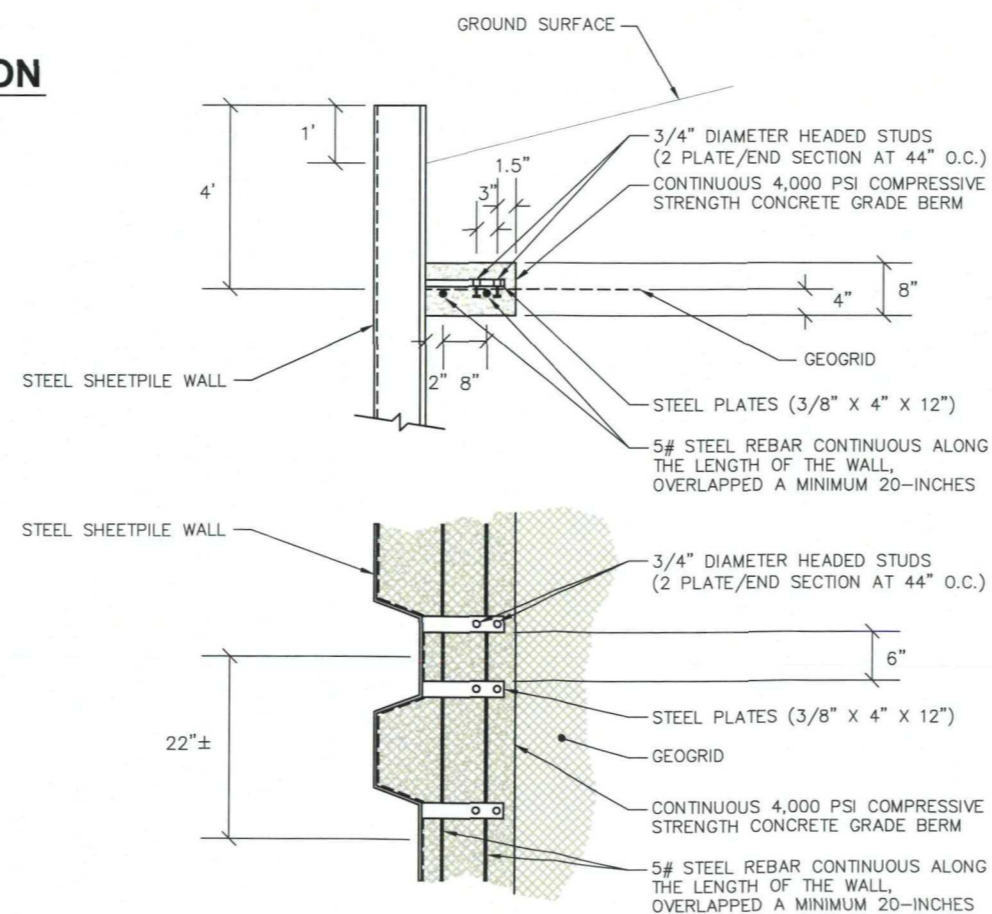
FINAL



**TYPICAL CROSS SECTION
ALONG RIVER**
NOT TO SCALE



CROSS SECTION ON NW END
OF SHEETPILE WALL
NOT TO SCALE



SHEETPILE WALL TIE-IN DETAIL
NOT TO SCALE

FIGURE NOTES:

1. SHEETPILE WALL DETAILS BASED ON DETAILS DRAWING PROVIDED BY RMT, INC. IN THE EROSION CONTROL SYSTEM DOCUMENTATION DATED MARCH 7, 1997.
2. WATER ELEVATION OF KALAMAZOO RIVER SHOWN HEREON IS APPROXIMATE.

ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
**FINAL REPORT FOR COMPLETION OF CONSTRUCTION
KING HIGHWAY LANDFILL OPERABLE UNIT**

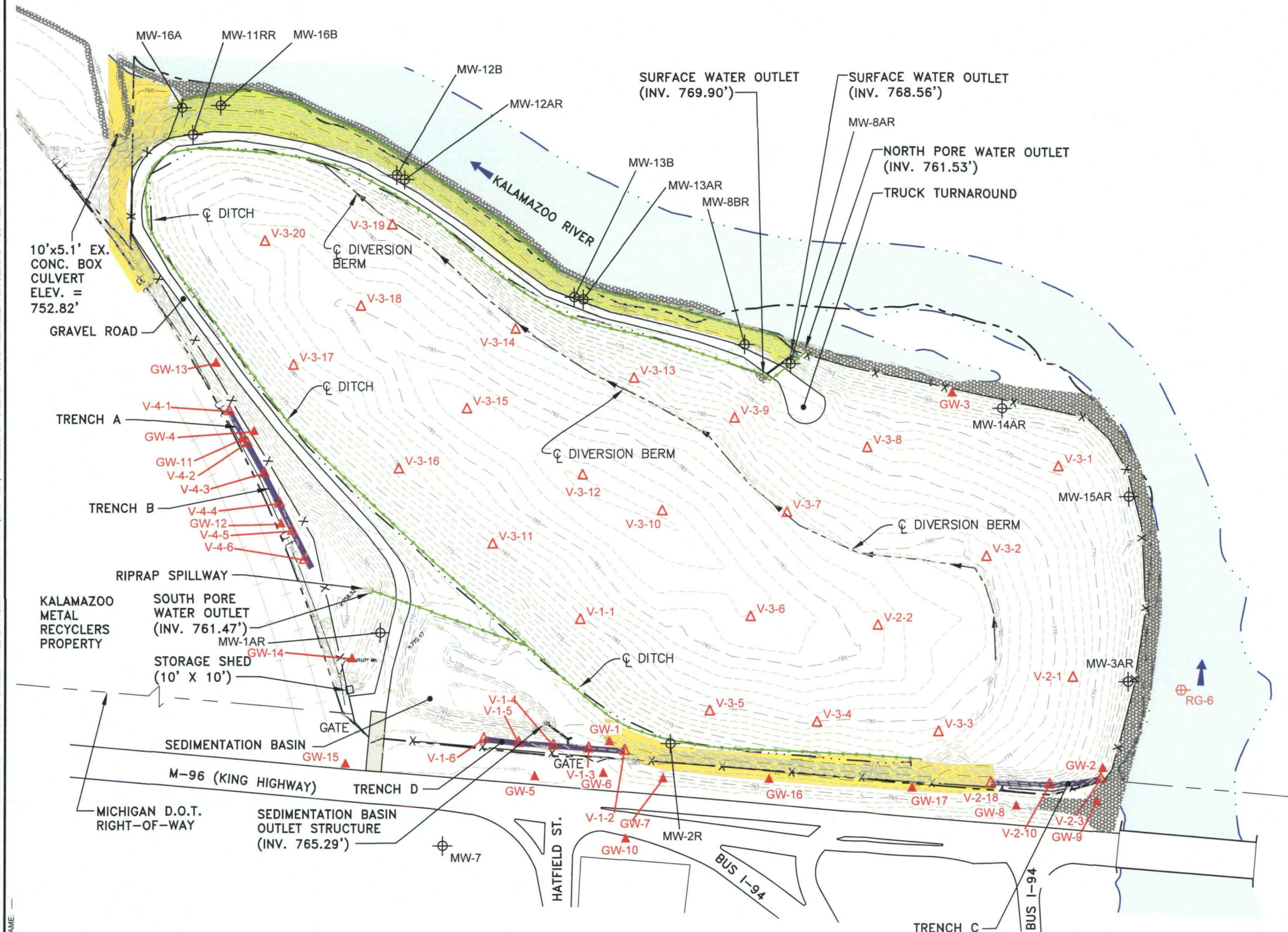
SHEETPILE WALL CONSTRUCTION DETAIL



FIGURE
5

FINAL

CITY, SYRACUSE DIV/GRP: ENV/CAD DB: G. STOWELL L. POSENAUER L. FORAKER LD: PIC: D. COWIN PM: D. PENNIMAN TM: D. PENNIMAN LVR: ON= OFF=REF= G:\ENV\CAD\SYRACUSE\ACT\B0064583X00\DWG\COMPLETION\B0064583X00.DWG LAYOUT: 6 SAVED: 4/17/2013 11:15 AM ACADVER: 18.15 (LMS TECH) PAGES: 18 PLOT: 4/17/2013 11:16 AM BY: FORAKER, LYDIA



- LEGEND:**
- APPROXIMATE OUTSIDE PARCEL BOUNDARY
 - . - . - DITCH LINE
 - - - - - ABANDONED RAILROAD
 - SHEETPILE WALL
 - ACCESS ROAD
 - RIPRAP
 - CULVERT PIPE
 - FINAL AS-BUILT INDEX CONTOUR
 - FINAL AS-BUILT INTERMEDIATE CONTOUR
 - X - SECURITY FENCE
 - PORE WATER COLLECTION PIPE
 - PORE WATER DRAIN
 - APPROXIMATE WATER EDGE
 - V-1-2 GAS VENTS
 - LANDFILL GAS CUTOFF TRENCH
 - FLOW DIRECTION
 - MW-14 MONITORING WELL
 - RG-3 FORMER RIVER GAUGE STATION (NO LONGER IN USE)
 - GW-2 LOCATION OF GAS MONITORING PROBES
 - APPROXIMATE LOCATION OF EROSION CONTROL MATTING AND CROWN VETCH PLANTING
 - APPROXIMATE LOCATION OF WILD FLOWER PLANTING

- NOTES:**
1. BASE MAP INFORMATION OBTAINED FROM CADD DRAWING FILE DEVELOPED BY RMT, INC., ANN ARBOR, MICHIGAN (CADD FILE: L1630SU01.DWG AS-BUILT SURVEY; 8/21/00).
 2. FINAL AS-BUILT CONTOUR ELEVATIONS ARE SHOWN AND ARE BASED ON A FIELD SURVEY BY ATWELL-HICKS, INC., DATED 9/27/00 WITH REVISIONS DATED 10/23/00, 12/21/01, 12/10/02, AND 7/24/03.
 3. ELEVATIONS ARE BASED ON NGVD OF 1929 (MSL).
 4. PROPERTY SURVEY PERFORMED BY WILKINS & WHEATON ENGINEERING CO., INC., ON 7/1/96.
 5. TOPOGRAPHIC CONTOUR INTERVAL IS 1 FOOT.
 6. LOCATIONS OF GW-5, GW-6, GW-7, GW-8, GW-9, AND GW-10 ARE BASED ON A FIELD SURVEY BY TERRA CONTRACTING LLC, DATED 9/23/05.
 7. LOCATION OF GW-11 IS BASED ON A FIELD SURVEY BY TERRA CONTRACTING LLC, DATED 1/11/06.
 8. LOCATIONS OF RG-6, V-4-4, V-4-5, AND V-4-6 ARE BASED ON A FIELD SURVEY BY TERRA CONTRACTING LLC, DATED 6/7/06.
 9. LOCATIONS OF V-1-2 THROUGH V-1-6, V-2-3, V-2-10, AND V-2-18 ARE BASED ON MULTIPLE FIELD SURVEYS CONDUCTED BY TERRA CONTRACTING, LLC. IN APRIL 2008. GAS VENTS V-2-4 THROUGH V-2-9, AND V-2-11 THROUGH V-2-17 ARE NOT SHOWN FOR CLARITY PURPOSES (THESE VENTS ARE LOCATED ALONG TRENCH C).
 10. LOCATION OF GW-12 IS APPROXIMATE.
 11. LOCATIONS OF GW-13 THROUGH GW-17 BASED ON FIELD SURVEY CONDUCTED BY PREIN & NEWHOF ON 11/1/11.

ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
**FINAL REPORT FOR COMPLETION OF CONSTRUCTION
KING HIGHWAY LANDFILL OPERABLE UNIT**

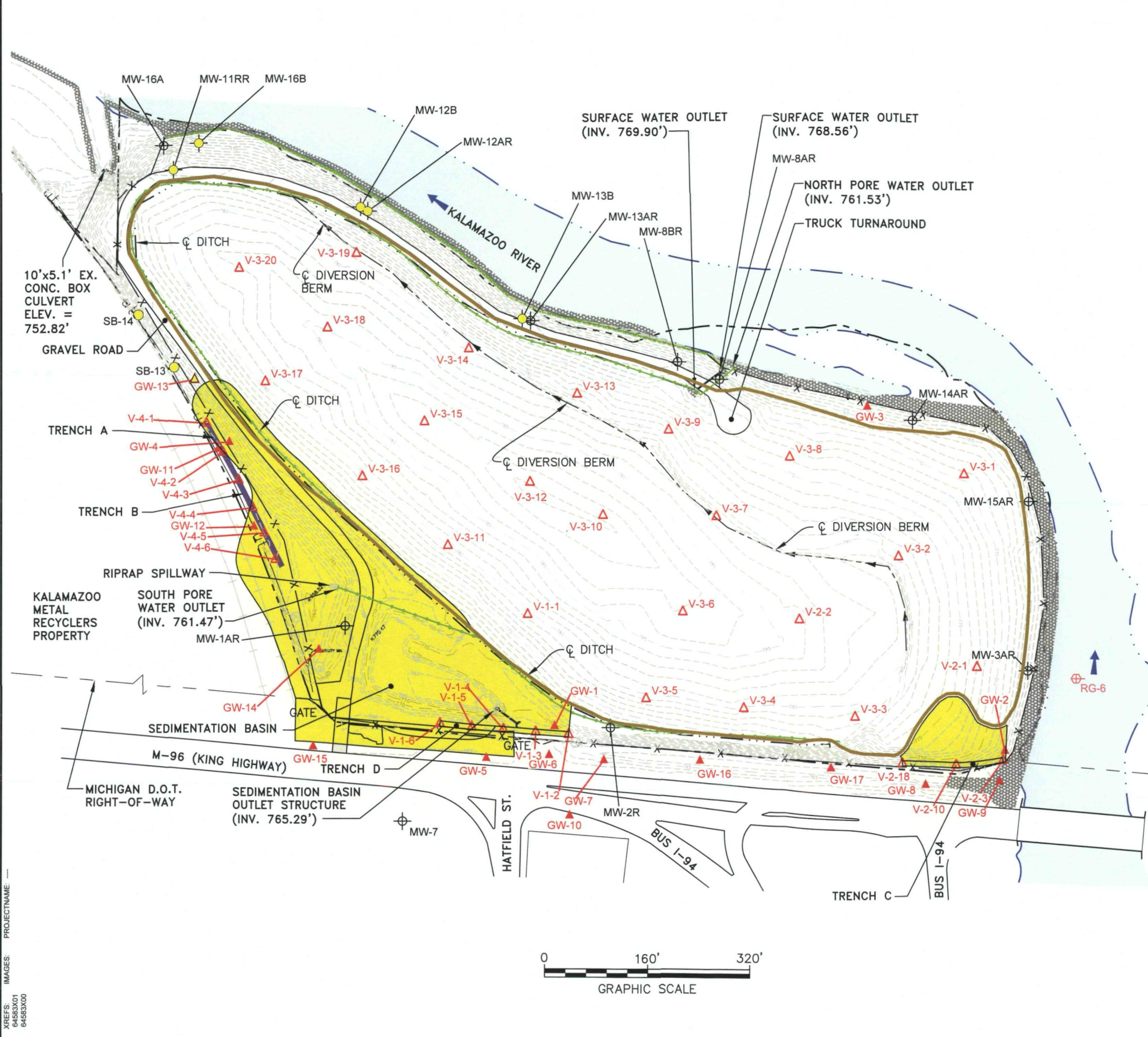
**LOCATIONS OF ENHANCED
EROSION CONTROLS**

ARCADIS

FIGURE
6

FINAL

CITY: SYRACUSE DIV: GROUP ENV: CAD DB: G. STOWELL L. ROSENBAUER L. FORAKER, LD. PIC: D. COMIN PM: D. PENNIMAN TM: D. PENNIMAN LYN: ON: OFF: REF: G:\ENV\CAD\SYRACUSE\ACT18006483\000\000\000\DWG\COMPLETION\6483006.DWG LAYOUT: 7. SAVER: 4/28/2013 2:15 PM ACADVER: 18.15 (LMS TECH) PLOTSTYLETABLE: PLT\FULL CTB PLOTTED: 4/28/2013 2:15 PM BY: FORAKER, LYDIA XREFS: 6483X01 6483X00 IMAGES: PROJECTNAME: ---



LEGEND:

- APPROXIMATE OUTSIDE PARCEL BOUNDARY
- - - DITCH LINE
- - - ABANDONED RAILROAD
- SHEETPILE WALL
- ACCESS ROAD
- RIPRAP
- CULVERT PIPE
- FINAL AS-BUILT INDEX CONTOUR
- FINAL AS-BUILT INTERMEDIATE CONTOUR
- X- SECURITY FENCE
- PORE WATER COLLECTION PIPE
- PORE WATER DRAIN
- APPROXIMATE WATER EDGE
- V-1-2 GAS VENTS
- LANDFILL GAS CUTOFF TRENCH
- FLOW DIRECTION
- MW-14 MONITORING WELL
- RG-3 FORMER RIVER GAUGE STATION (NO LONGER IN USE)
- GW-2 LOCATION OF GAS MONITORING PROBES
- APPROXIMATE LIMITS OF WASTE
- APPROXIMATE LIMITS OF REMAINING IN-PLACE RESIDUALS (SEE NOTE 12)

NOTES:

1. BASE MAP INFORMATION OBTAINED FROM CADD DRAWING FILE DEVELOPED BY RMT, INC., ANN ARBOR, MICHIGAN (CADD FILE: L1630SU01.DWG AS-BUILT SURVEY; 8/21/00).
2. FINAL AS-BUILT CONTOUR ELEVATIONS ARE SHOWN AND ARE BASED ON A FIELD SURVEY BY ATWELL-HICKS, INC., DATED 9/27/00 WITH REVISIONS DATED 10/23/00, 12/21/01, 12/10/02, AND 7/24/03.
3. ELEVATIONS ARE BASED ON NGVD OF 1929 (MSL).
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5. TOPOGRAPHIC CONTOUR INTERVAL IS 1 FOOT.
6. LOCATIONS OF GW-5, GW-6, GW-7, GW-8, GW-9, AND GW-10 ARE BASED ON A FIELD SURVEY BY TERRA CONTRACTING LLC, DATED 9/23/05.
7. LOCATION OF GW-11 IS BASED ON A FIELD SURVEY BY TERRA CONTRACTING LLC, DATED 1/11/06.
8. LOCATIONS OF RG-6, V-4-4, V-4-5, AND V-4-6 ARE BASED ON A FIELD SURVEY BY TERRA CONTRACTING LLC, DATED 6/7/06.
9. LOCATIONS OF V-1-2 THROUGH V-1-6, V-2-3, V-2-10, AND V-2-18 ARE BASED ON MULTIPLE FIELD SURVEYS CONDUCTED BY TERRA CONTRACTING, LLC, IN APRIL 2008. GAS VENTS V-2-4 THROUGH V-2-9, AND V-2-11 THROUGH V-2-17 ARE NOT SHOWN FOR CLARITY PURPOSES (THESE VENTS ARE LOCATED ALONG TRENCH C).
10. LOCATION OF GW-12 IS APPROXIMATE.
11. LOCATIONS OF GW-13 THROUGH GW-17 BASED ON FIELD SURVEY CONDUCTED BY PREIN & NEWHOF ON 11/1/11.
12. YELLOW SHADED AREAS REPRESENT KNOWN REMAINING IN-PLACE RESIDUALS LOCATED BELOW GRADE OUTSIDE THE LIMIT OF WASTE.

- NOTES:**
1. BASE MAP INFORMATION OBTAINED FROM CADD DRAWING FILE DEVELOPED BY RMT, INC., ANN ARBOR, MICHIGAN (CADD FILE: L1630SU01.DWG AS-BUILT SURVEY; 8/21/00).
 2. FINAL AS-BUILT CONTOUR ELEVATIONS ARE SHOWN AND ARE BASED ON A FIELD SURVEY BY ATWELL-HICKS, INC., DATED 9/27/00 WITH REVISIONS DATED 10/23/00, 12/21/01, 12/10/02, AND 7/24/03.
 3. ELEVATIONS ARE BASED ON NGVD OF 1929 (MSL).
 4. PROPERTY SURVEY PERFORMED BY WILKINS & WHEATON ENGINEERING CO., INC., ON 7/1/96.
 5. TOPOGRAPHIC CONTOUR INTERVAL IS 1 FOOT.
 6. LOCATIONS OF GW-5, GW-6, GW-7, GW-8, GW-9, AND GW-10 ARE BASED ON A FIELD SURVEY BY TERRA CONTRACTING LLC, DATED 9/23/05.
 7. LOCATION OF GW-11 IS BASED ON A FIELD SURVEY BY TERRA CONTRACTING LLC, DATED 1/11/06.
 8. LOCATIONS OF RG-6, V-4-4, V-4-5, AND V-4-6 ARE BASED ON A FIELD SURVEY BY TERRA CONTRACTING LLC, DATED 6/7/06.
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 10. LOCATION OF GW-12 IS APPROXIMATE.
 11. LOCATIONS OF GW-13 THROUGH GW-17 BASED ON FIELD SURVEY CONDUCTED BY PREIN & NEWHOF ON 11/1/11.
 12. YELLOW SHADED AREAS REPRESENT KNOWN REMAINING IN-PLACE RESIDUALS LOCATED BELOW GRADE OUTSIDE THE LIMIT OF WASTE.

ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
**FINAL REPORT FOR COMPLETION OF CONSTRUCTION
KING HIGHWAY LANDFILL OPERABLE UNIT**

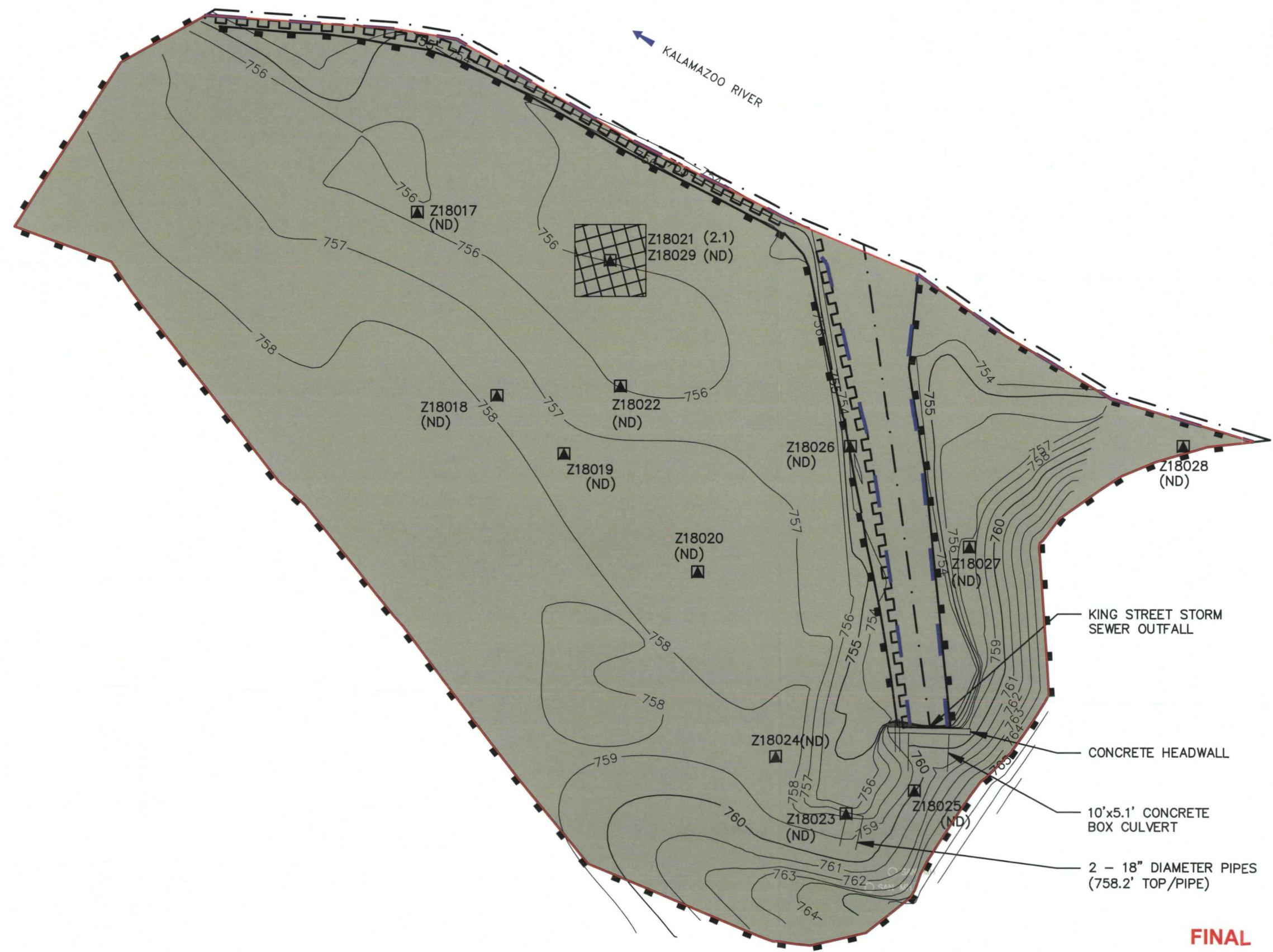
**APPROXIMATE LIMIT OF WASTE LINE AND
REMAINING RESIDUALS LOCATED BELOW
GRADE OUTSIDE LIMIT OF WASTE**

FINAL

ARCADIS

FIGURE
7

CITY: SYRACUSE DIV: GROUP ENV: CAD DB: L. POSENAUER L. FORAKER LD: PIC: D. COWIN PM: D. PENNIMAN TMI: D. PENNIMAN LVR: ON+ OFF+ REF+
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XREFS: 64583X00
IMAGES PROJECTNAME: -----



FINAL

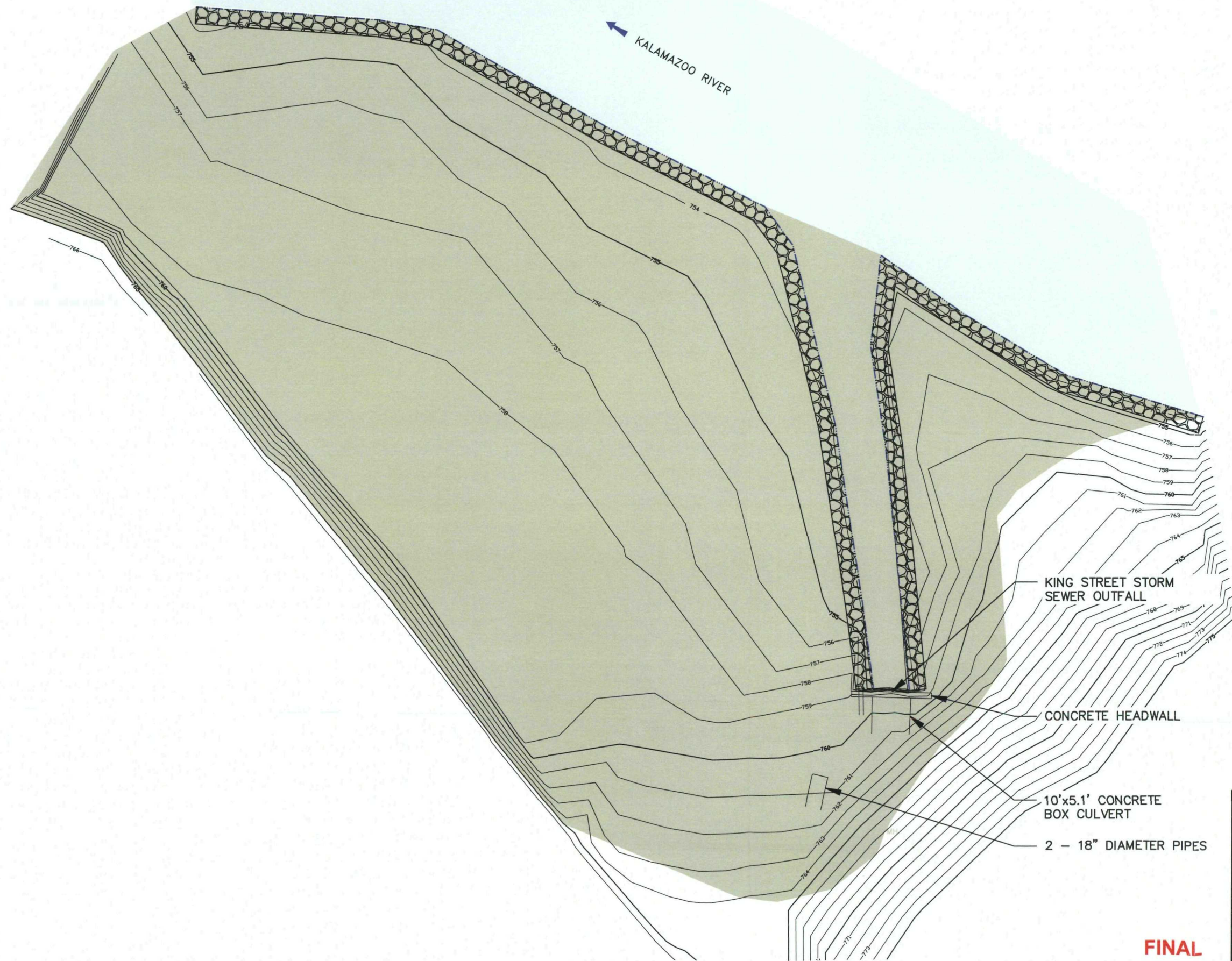
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KALAMAZOO RIVER SUPERFUND SITE
**FINAL REPORT FOR COMPLETION OF CONSTRUCTION
KING HIGHWAY LANDFILL OPERABLE UNIT**

**EXTENT OF EXCAVATION AND VERIFICATION
SAMPLE RESULTS AT THE KSSS**

ARCADIS

FIGURE
8

CITY: SYRACUSE DIV: GROUP ENVCAD DB: L. ROSENBAUER L. FORAKER LD: PIC: D. COVIN PM: D. PENNIMAN TM: D. PENNIMAN LXR: ON+ OFF+ REF+
G:\ENVCAD\SYRACUSE\ACT\B006493\000400007\DWG\COMPLETION\6493B08.DWG LAYOUT: 9 SAVED: 4/7/2013 11:18 AM ACADVER: 18.15 (LMS TECH) PAGESETUP: C:\B-PDF PLOT\STYLETABLE: PLTFULL.CTB PLOTTED: 4/7/2013 11:18 AM BY: FORAKER, LYDIA
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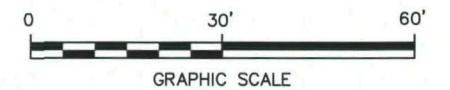


LEGEND:

- 760 — FINAL AS-BUILT ELEVATION CONTOUR
- ← FLOW DIRECTION
- - - - - APPROXIMATE WATER EDGE
- APPROXIMATE LIMITS OF REMEDIAL ACTIVITIES
- APPROXIMATE AREA OF RIPRAP

NOTES:

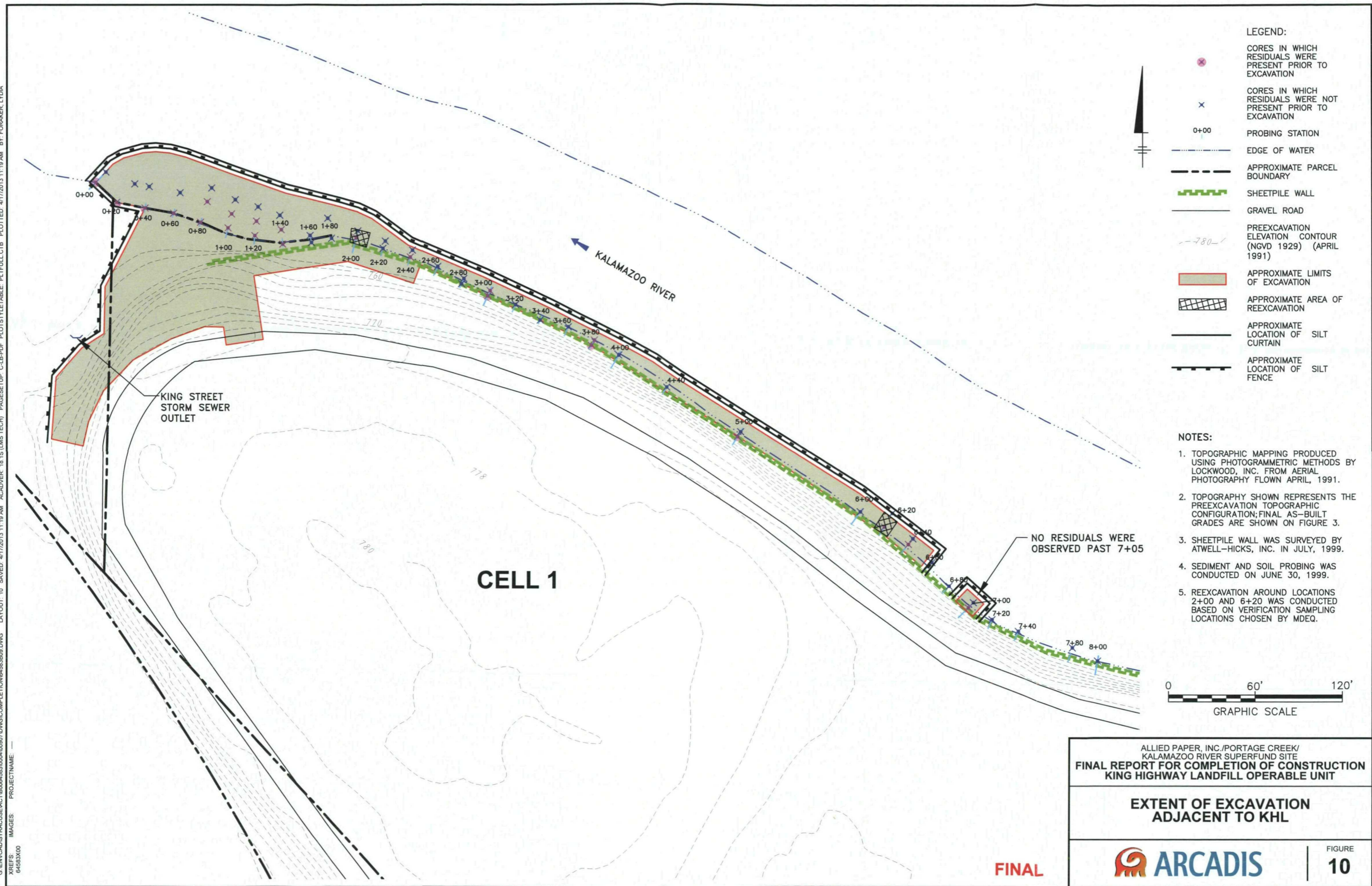
1. LIMITS OF REMEDIAL ACTIVITIES ARE BASED ON FIELD MEASUREMENTS COLLECTED BY BLASLAND, BOUCK & LEE, INC. PERSONNEL AND ARE APPROXIMATE ONLY.
2. FINAL CONTOUR ELEVATIONS BASED ON A FIELD SURVEY BY ATWELL-HICKS, INC. ON 9/10/99.

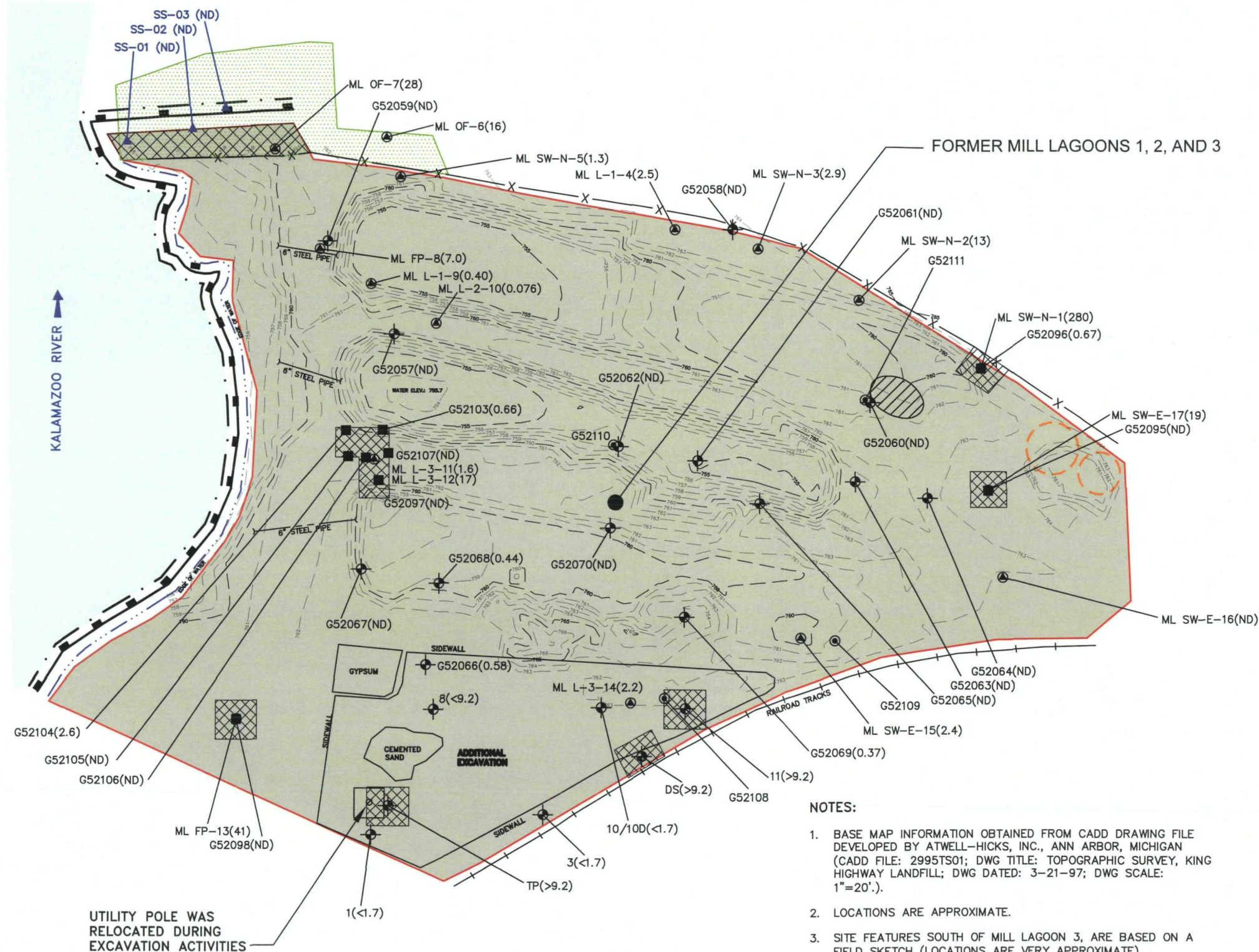


ALLIED PAPER, INC./PORTAGE CREEK/ KALAMAZOO RIVER SUPERFUND SITE FINAL REPORT FOR COMPLETION OF CONSTRUCTION KING HIGHWAY LANDFILL OPERABLE UNIT	
KSSS SITE RESTORATION	
	FIGURE 9

FINAL

CITY: SYRACUSE DIV: GROUP: ENV: CAD: DB: G: STOWELL, L: POSEMAUER, L: FORAKER, LD: PIC: D: COWIN, PM: D: PENNIMAN, TM: D: PENNIMAN, LYN: ON: OFF: REF: G: ENV: CAD: SYRACUSE: ACT: B: 0064530004000907: DWG: COMPLETION: 04/03/2009: DWG: LAYOUT: 10: SAVED: 4/17/2013 11:19 AM: ACADVER: 18 (S: LMS TECH): PAGES: 18: BY: FORAKER, LYDIA





NOTES:

1. BASE MAP INFORMATION OBTAINED FROM CADD DRAWING FILE DEVELOPED BY ATWELL-HICKS, INC., ANN ARBOR, MICHIGAN (CADD FILE: 2995TS01; DWG TITLE: TOPOGRAPHIC SURVEY, KING HIGHWAY LANDFILL; DWG DATED: 3-21-97; DWG SCALE: 1"=20').
2. LOCATIONS ARE APPROXIMATE.
3. SITE FEATURES SOUTH OF MILL LAGOON 3, ARE BASED ON A FIELD SKETCH (LOCATIONS ARE VERY APPROXIMATE).
4. SAMPLES SOUTH OF MILL LAGOON 3 WERE ANALYZED USING AN ENSYS FIELD TEST KIT SET TO TEST FOR PCB CONCENTRATIONS ABOVE OR BELOW 1.7 AND 9.2 mg/kg.
5. THE THREE 6-INCH DIAMETER STEEL PIPE LOCATED ALONG THE WESTERN BORDER OF FORMER MILL LAGOONS 1, 2, AND 3 WERE REMOVED AND PLACED INTO CELL 4.

FINAL

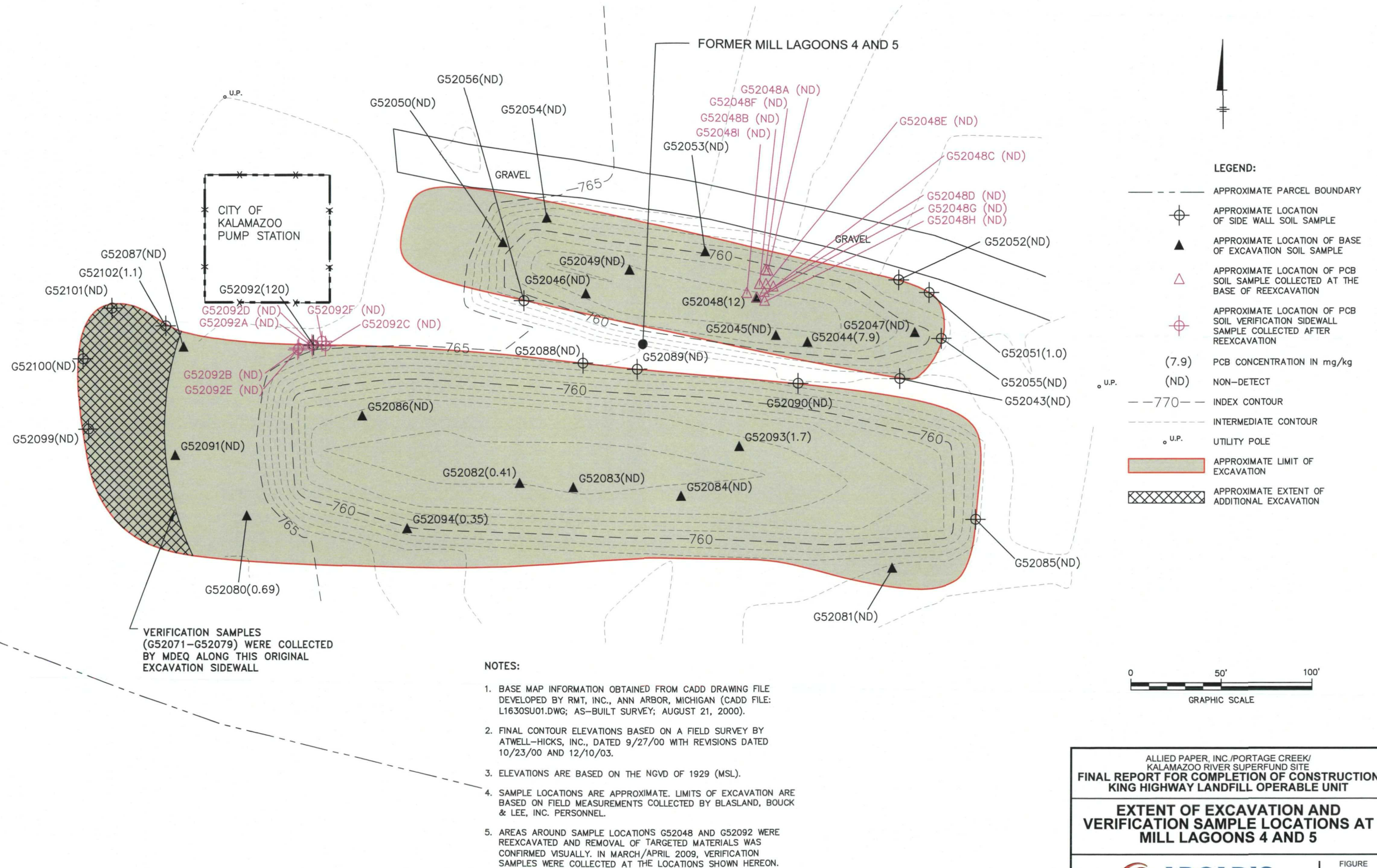
ALLIED PAPER, INC./PORTAGE CREEK/
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FINAL REPORT FOR COMPLETION OF CONSTRUCTION
KING HIGHWAY LANDFILL OPERABLE UNIT

EXTENT OF EXCAVATION AND
VERIFICATION OF SAMPLE LOCATIONS
AT MILL LAGOONS 1, 2, AND 3



FIGURE
11

CITY: SYRACUSE DIV: GROUP ENV: CAD DB: L. ROSENAUER L. FORAKER LD. PIC: D. COWIN PM: D. PENNIMAN TM: D. PENNIMAN LTR: ON* OFF: REF
G:\ENV\CAD\SYRACUSE\ACT\B0064583\0004\00907\DWG\COMPLETION\64583B11.DWG LAYOUT: 12 SAVED: 4/17/2013 11:20 AM ACADVER: 18 IS (LMS TECH) PAGES: 18 PLOT: 4/17/2013 11:21 AM BY: FORAKER, LYDIA
XREFS: 64583X05 64583X00
IMAGES: PROJECTNAME: ---



FINAL

ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
**FINAL REPORT FOR COMPLETION OF CONSTRUCTION
KING HIGHWAY LANDFILL OPERABLE UNIT**

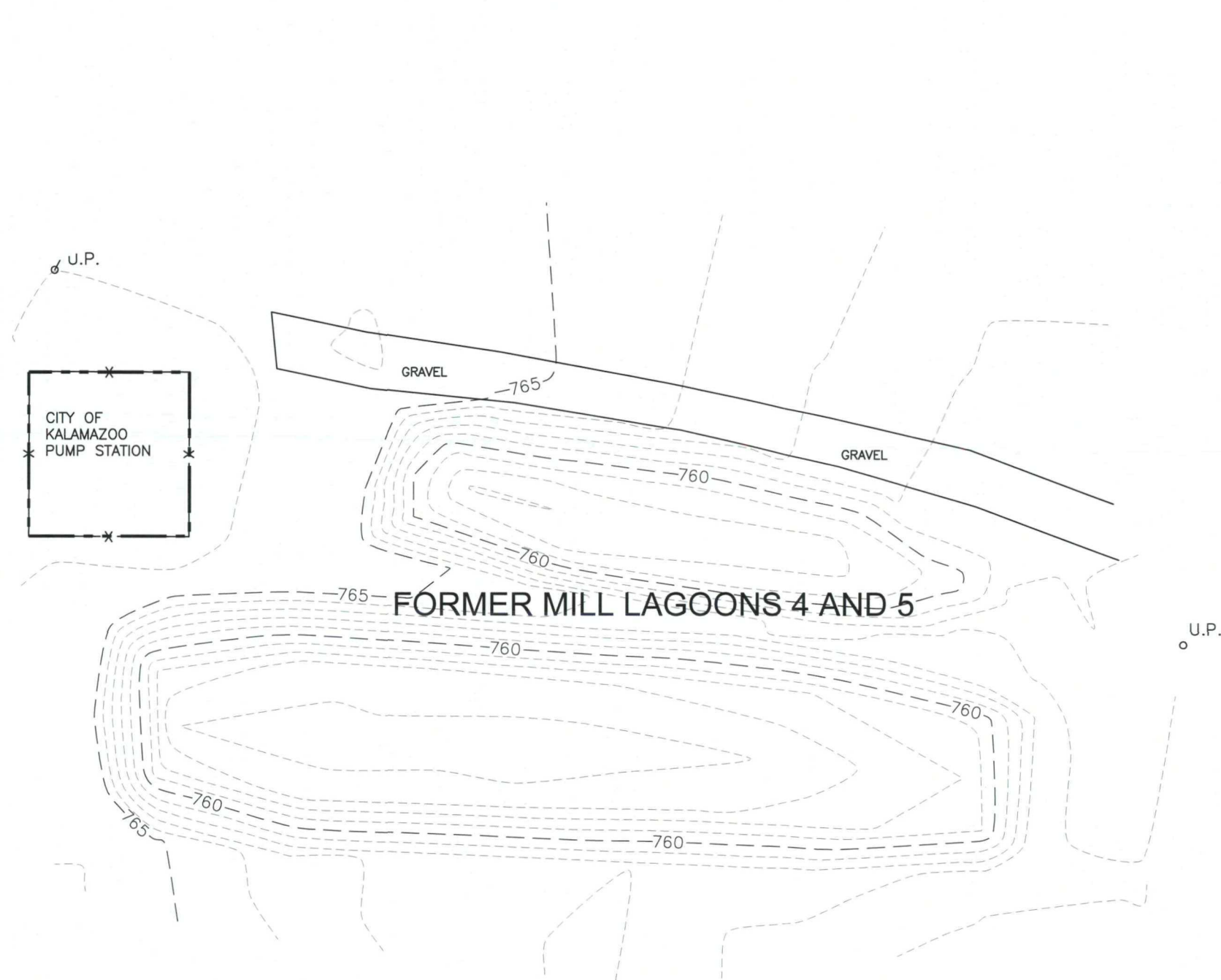
**EXTENT OF EXCAVATION AND
VERIFICATION SAMPLE LOCATIONS AT
MILL LAGOONS 4 AND 5**

ARCADIS

FIGURE
12



FINAL

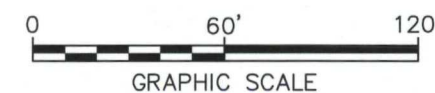


LEGEND:

- 770--- FINAL AS-BUILT INDEX CONTOUR
- FINAL AS-BUILT INTERMEDIATE CONTOUR
- X--- SECURITY FENCE
- o U.P. UTILITY POLE

NOTES:

1. BASE MAP INFORMATION OBTAINED FROM CADD DRAWING FILE DEVELOPED BY RMT, INC., ANN ARBOR, MICHIGAN (CADD FILE: L1630SU01.DWG; AS-BUILT SURVEY; AUGUST 21, 2000).
2. FINAL AS-BUILT CONTOUR ELEVATIONS ARE SHOWN AND ARE BASED ON A FIELD SURVEY BY ATWELL-HICKS, INC., DATED 9/27/00 WITH REVISIONS DATED 10/23/00 AND 12/10/02.
3. ELEVATIONS ARE BASED ON THE NGVD OF 1929 (MSL).



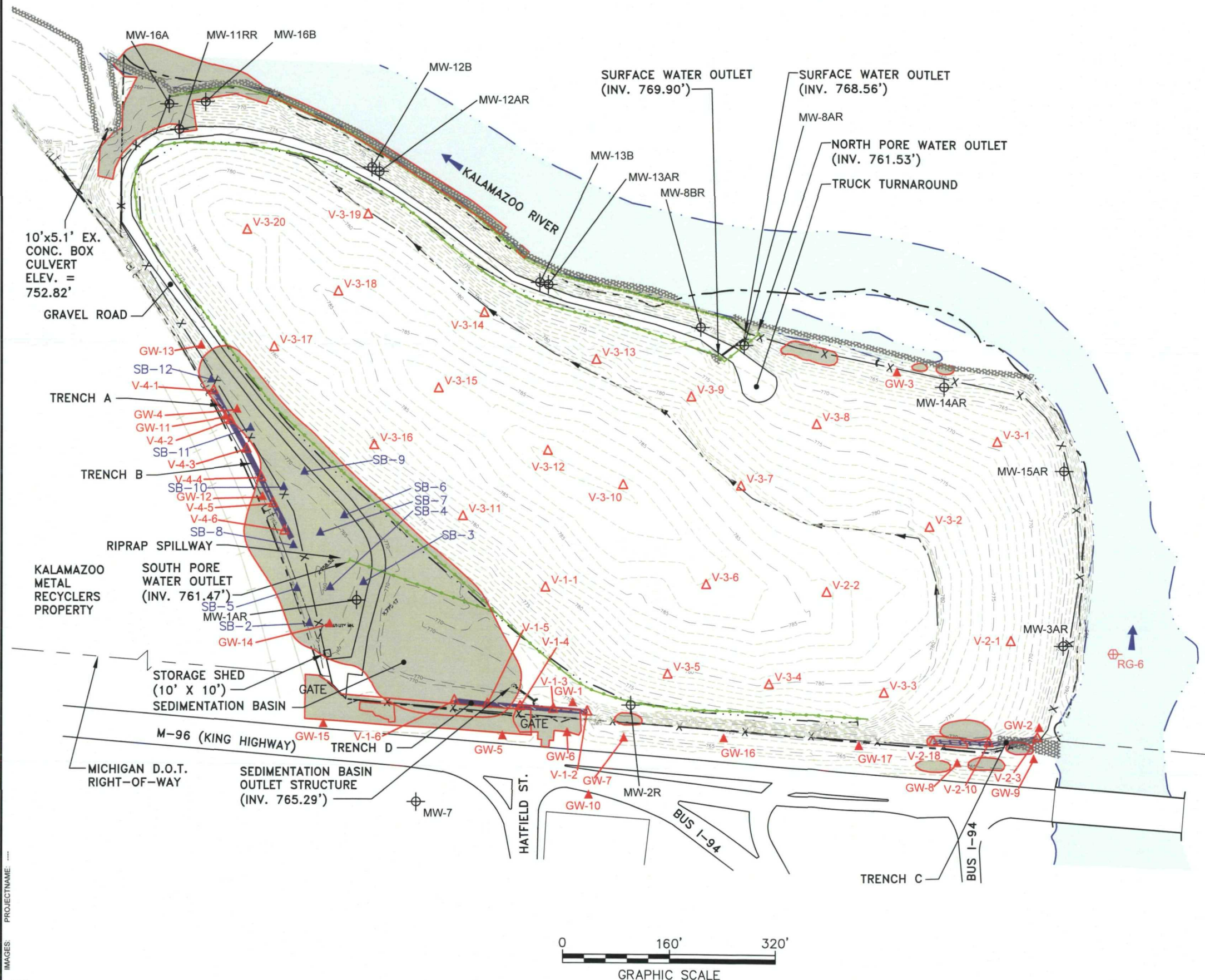
ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
**FINAL REPORT FOR COMPLETION OF CONSTRUCTION
KING HIGHWAY LANDFILL OPERABLE UNIT**

**MILL LAGOONS 4 AND 5
SITE RESTORATION**



FIGURE
14

FINAL



- LEGEND:**
- | | |
|--|---|
| | APPROXIMATE OUTSIDE PARCEL BOUNDARY |
| | DITCH LINE |
| | ABANDONED RAILROAD |
| | SHEETPILE WALL |
| | ACCESS ROAD |
| | RIPRAP |
| | CULVERT PIPE |
| | FINAL AS-BUILT INDEX CONTOUR |
| | FINAL AS-BUILT INTERMEDIATE CONTOUR |
| | SECURITY FENCE |
| | PORE WATER COLLECTION PIPE |
| | PORE WATER DRAIN |
| | APPROXIMATE WATER EDGE |
| | GAS VENTS |
| | LANDFILL GAS CUTOFF TRENCH |
| | FLOW DIRECTION |
| | MONITORING WELL |
| | FORMER RIVER GAUGE STATION
(NO LONGER IN USE) |
| | LOCATION OF GAS MONITORING PROBES |
| | APPROXIMATE LIMITS OF EXCAVATION ACTIVITIES |
| | APPROXIMATE LOCATION OF TEST PIT AS SHOWN
ON THE JULY 26, 1999 LETTER (APPENDIX A) |

- NOTES:**
1. BASE MAP INFORMATION OBTAINED FROM CADD DRAWING FILE DEVELOPED BY RMT, INC., ANN ARBOR, MICHIGAN (CADD FILE: L1630SU01.DWG AS-BUILT SURVEY; 8/21/00).
 2. FINAL AS-BUILT CONTOUR ELEVATIONS ARE SHOWN AND ARE BASED ON A FIELD SURVEY BY ATWELL-HICKS, INC., DATED 9/27/00 WITH REVISIONS DATED 10/23/00, 12/21/01, 12/10/02, AND 7/24/03.
 3. ELEVATIONS ARE BASED ON NGVD OF 1929 (MSL).
 4. PROPERTY SURVEY PERFORMED BY WILKINS & WHEATON ENGINEERING CO., INC., ON 7/1/96.
 5. TOPOGRAPHIC CONTOUR INTERVAL IS 1 FOOT.
 6. LOCATIONS OF GW-5, GW-6, GW-7, GW-8, GW-9, AND GW-10 ARE BASED ON A FIELD SURVEY BY TERRA CONTRACTING LLC, DATED 9/23/05.
 7. LOCATION OF GW-11 IS BASED ON A FIELD SURVEY BY TERRA CONTRACTING LLC, DATED 1/11/06.
 8. LOCATIONS OF RG-6, V-4-4, V-4-5, AND V-4-6 ARE BASED ON A FIELD SURVEY BY TERRA CONTRACTING LLC, DATED 6/7/06.
 9. LOCATIONS OF V-1-2 THROUGH V-1-6, V-2-3, V-2-10, AND V-2-18 ARE BASED ON MULTIPLE FIELD SURVEYS CONDUCTED BY TERRA CONTRACTING, LLC. IN APRIL 2008. GAS VENTS V-2-4 THROUGH V-2-9, AND V-2-11 THROUGH V-2-17 ARE NOT SHOWN FOR CLARITY PURPOSES (THESE VENTS ARE LOCATED ALONG TRENCH C).
 10. LOCATION OF GW-12 IS APPROXIMATE.
 11. LOCATIONS OF GW-13 THROUGH GW-17 BASED ON FIELD SURVEY CONDUCTED BY PREIN & NEWHOF ON 11/1/11.

ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
**FINAL REPORT FOR COMPLETION OF CONSTRUCTION
KING HIGHWAY LANDFILL OPERABLE UNIT**

**RESIDUAL REMOVAL AREAS OUTSIDE
CONSTRUCTION LIMITS OF RESIDUALS**

FIGURE
15

FINAL

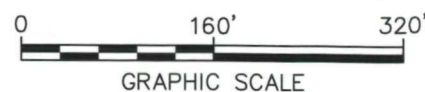


FIGURE 16

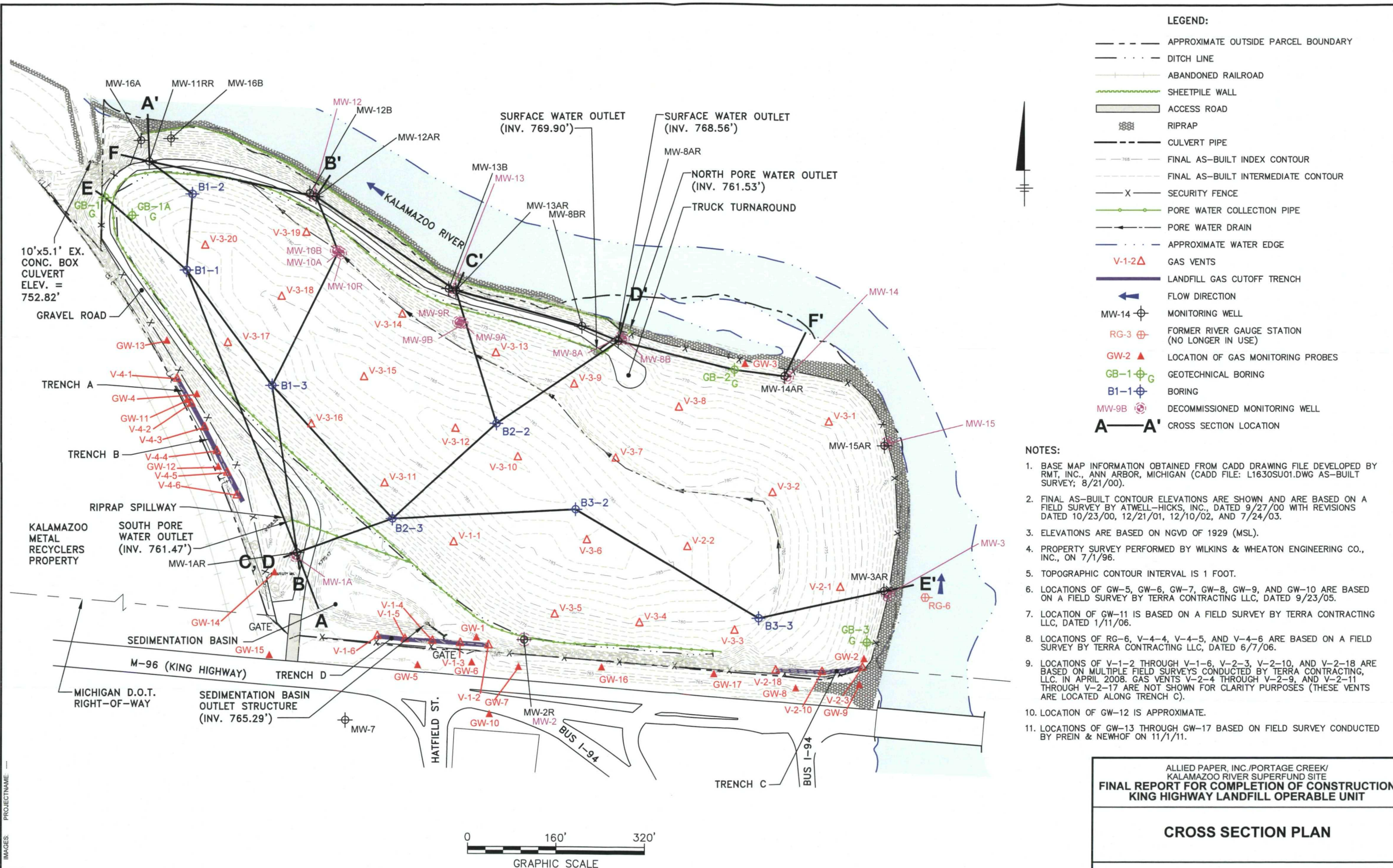
	APPROXIMATE OUTSIDE PARCEL BOUNDARY
	DITCH LINE
	ABANDONED RAILROAD
	SHEETPILE WALL
	ACCESS ROAD
	RIPRAP
	CULVERT PIPE
	FINAL AS-BUILT INDEX CONTOUR
	FINAL AS-BUILT INTERMEDIATE CONTOUR
	SECURITY FENCE
	PORE WATER COLLECTION PIPE
	PORE WATER DRAIN
	APPROXIMATE WATER EDGE
	GAS VENTS
	LANDFILL GAS CUTOFF TRENCH
	FLOW DIRECTION
	MONITORING WELL
	FORMER RIVER GAUGE STATION (NO LONGER IN USE)
	LOCATION OF GAS MONITORING PROBES

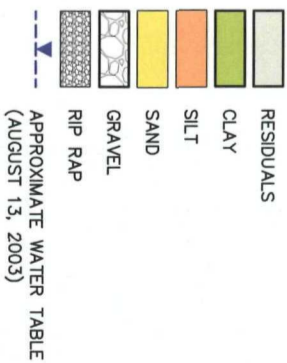
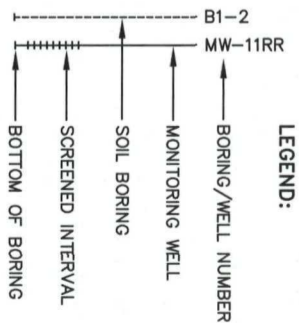
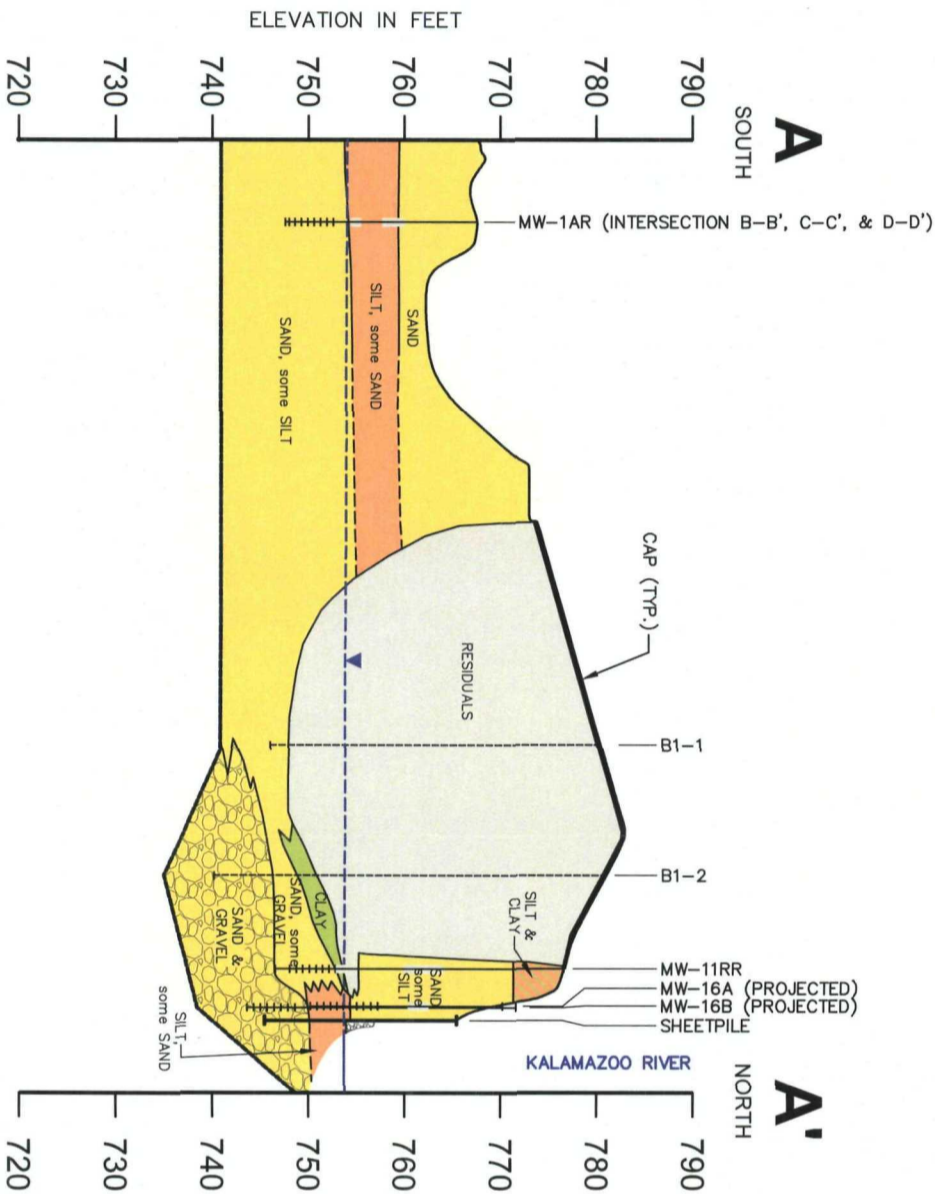
1. BASE MAP INFORMATION OBTAINED FROM CADD DRAWING FILE DEVELOPED BY RMT, INC., ANN ARBOR, MICHIGAN (CADD FILE: L1630SU01.DWG AS-BUILT SURVEY; 8/21/00).
2. FINAL AS-BUILT CONTOUR ELEVATIONS ARE SHOWN AND ARE BASED ON A FIELD SURVEY BY ATWELL-HICKS, INC., DATED 9/27/00 WITH REVISIONS DATED 10/23/00, 12/21/01, 12/10/02, AND 7/24/03.
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7. LOCATION OF GW-11 IS BASED ON A FIELD SURVEY BY TERRA CONTRACTING LLC, DATED 1/11/06.
8. LOCATIONS OF RG-6, V-4-4, V-4-5, AND V-4-6 ARE BASED ON A FIELD SURVEY BY TERRA CONTRACTING LLC, DATED 6/7/06.
9. LOCATIONS OF V-1-2 THROUGH V-1-6, V-2-3, V-2-10, AND V-2-18 ARE BASED ON MULTIPLE FIELD SURVEYS CONDUCTED BY TERRA CONTRACTING, LLC. IN APRIL 2008. GAS VENTS V-2-4 THROUGH V-2-9, AND V-2-11 THROUGH V-2-17 ARE NOT SHOWN FOR CLARITY PURPOSES (THESE VENTS ARE LOCATED ALONG TRENCH C).
10. LOCATION OF GW-12 IS APPROXIMATE.
11. LOCATIONS OF GW-13 THROUGH GW-17 BASED ON FIELD SURVEY CONDUCTED BY PREIN & NEWHOF ON 11/1/11.

ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
**FINAL REPORT FOR COMPLETION OF CONSTRUCTION
KING HIGHWAY LANDFILL OPERABLE UNIT**

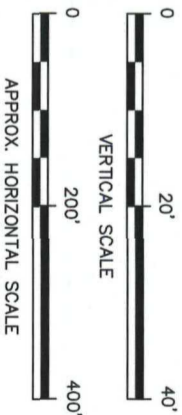
TOP OF WASTE GRADING PLAN

CITY: SYRACUSE DIV/GROUP: ENV/CAD DB: G. STOWELL L. POSEMAUER L. FORAKER LD. PIC: D. COVIN PM: D. PENNIMAN TM: D. PENNIMAN LVR: ON=OFF=REF-
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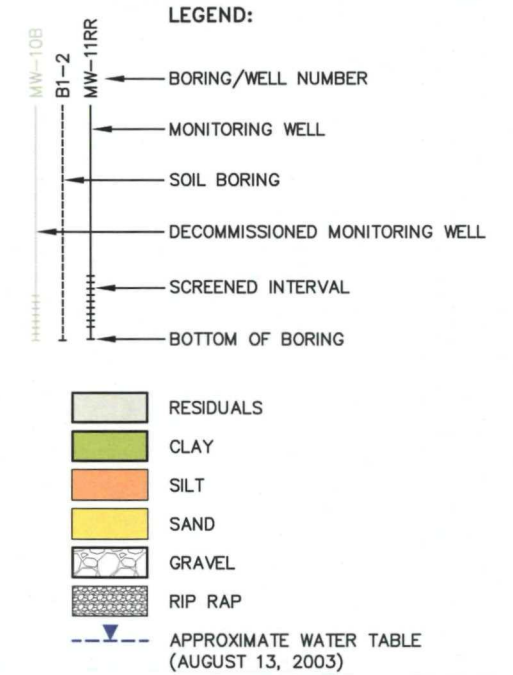
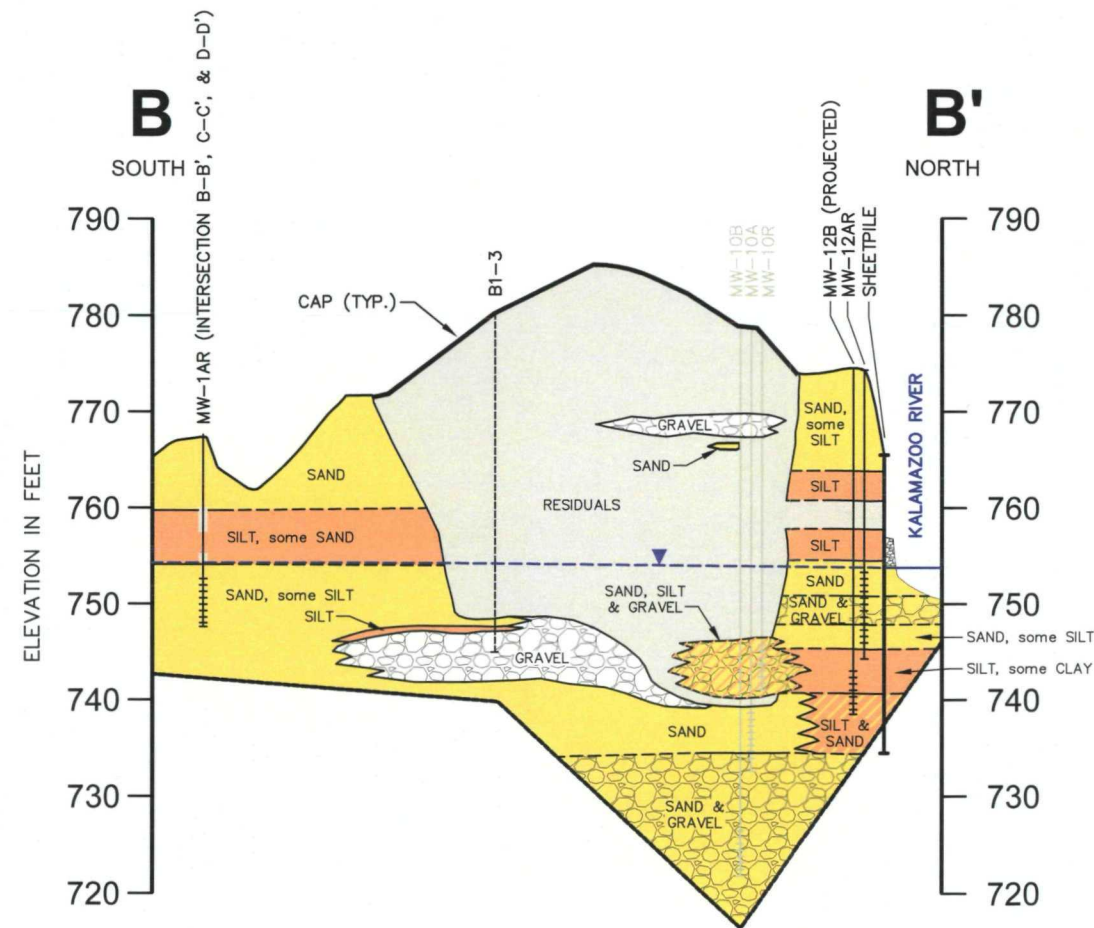
- NOTES:
- SUBSURFACE CROSS SECTION TAKEN FROM "TECHNICAL MEMORANDUM 6 - KING HIGHWAY LANDFILL OPERABLE UNIT", (BLASLAND, BOUCK & LEE, INC., 3/94).
 - TOPOGRAPHIC MAPPING FOR SUBSURFACE CROSS SECTIONS PRODUCED USING PHOTOGRAMMETRIC METHODS BY LOCKWOOD, INC. FROM AERIAL PHOTOGRAPHY FLOWN 4/91.
 - SURFACE CONTOUR ELEVATIONS SHOWN ARE BASED ON A FIELD SURVEY BY ATWELL-HICKS, INC. ON 9/27/00.
 - SURFACE WATER ELEVATION IS APPROXIMATE.
 - SHEETPILE PROJECTED ONTO SECTION.
 - WELL/BORING LOCATIONS SURVEYED BY WADE-TRIM, INC.
 - SILT AND CLAY UNIT AT MW-11RR IS BACKFILL USED FOR ACCESS TO DRILLING LOCATION.
 - STRATIGRAPHY FROM MW-16A IS DEPICTED ON THE SECTION TO AN APPROXIMATE ELEVATION OF 748 FEET AMSL, AND THE STRATIGRAPHY DEPICTED FOR THE INTERVAL 748 TO 741 FEET AMSL IS TAKEN FROM MW-16B.
 - DEPTH OF RESIDUALS IN MW-1AR, MW-11RR, AND MW-16B WERE APPROXIMATED BASED ON MONITORING WELL CONSTRUCTION LOGS.



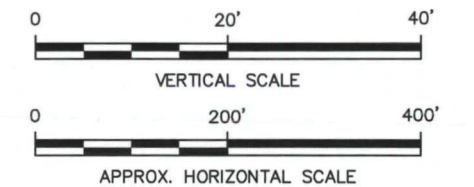
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**FINAL REPORT FOR COMPLETION OF CONSTRUCTION
KING HIGHWAY LANDFILL OPERABLE UNIT**

GEOLOGIC CROSS SECTION A-A'

FINAL



- NOTES:
- SUBSURFACE CROSS SECTION TAKEN FROM "TECHNICAL MEMORANDUM 6 - KING HIGHWAY LANDFILL OPERABLE UNIT", (BLASLAND, BOUCK & LEE, INC., 3/94).
 - TOPOGRAPHIC MAPPING FOR SUBSURFACE CROSS SECTIONS PRODUCED USING PHOTOGRAMMETRIC METHODS BY LOCKWOOD, INC. FROM AERIAL PHOTOGRAPHY FLOWN 4/91.
 - SURFACE CONTOUR ELEVATIONS SHOWN ARE BASED ON A FIELD SURVEY BY ATWELL-HICKS, INC. ON 9/27/00.
 - SURFACE WATER ELEVATION IS APPROXIMATE.
 - SHEETPILE PROJECTED ONTO SECTION.
 - WELL/BORING LOCATIONS SURVEYED BY WADE-TRIM, INC.
 - STRATIGRAPHY FROM MW-12AR IS DEPICTED ON THE SECTION TO AN APPROXIMATE ELEVATION OF 744 FEET AMSL, AND THE STRATIGRAPHY DEPICTED FOR THE INTERVAL 744 TO 738 FEET AMSL IS TAKEN FROM MW-12B (PROJECTED ONTO THE SECTION).
 - DEPTH OF RESIDUALS IN MW-1AR WAS APPROXIMATED BASED ON MONITORING WELL CONSTRUCTION LOG.



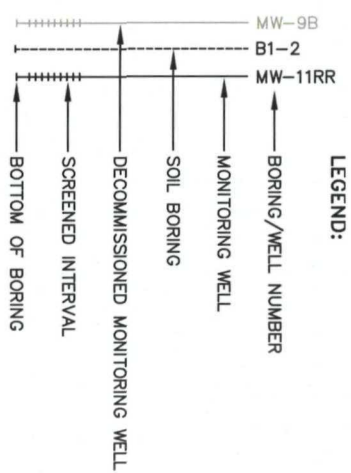
ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
FINAL REPORT FOR COMPLETION OF CONSTRUCTION
KING HIGHWAY LANDFILL OPERABLE UNIT

GEOLOGIC CROSS SECTION B-B'



FIGURE
19

FINAL



- ▲--- APPROXIMATE WATER TABLE
(AUGUST 13, 2003)

1. SUBSURFACE CROSS SECTION TAKEN FROM "TECHNICAL MEMORANDUM 6 - KING HIGHWAY LANDFILL OPERABLE UNIT", (BLASLAND, BOUCK & LEE, INC., 3/94).

2. TOPOGRAPHIC MAPPING FOR SUBSURFACE CROSS SECTIONS PRODUCED USING PHOTOGRAMMETRIC METHODS BY LOCKWOOD, INC. FROM AERIAL PHOTOGRAPHY FLOWN 4/91.

3. SURFACE CONTOUR ELEVATIONS SHOWN ARE BASED ON A FIELD SURVEY BY ATWELL-HICKS, INC. ON 9/27/00.

4. SURFACE WATER ELEVATION IS APPROXIMATE.

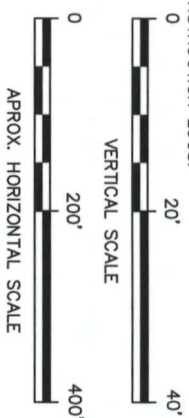
5. SHEETPILE PROJECTED ONTO SECTION.

6. WELL/BORING LOCATIONS SURVEYED BY WADE-TRIM, INC.

7. STRATIGRAPHY FROM MW-9A IS DEPICTED ON THE SECTION TO AN APPROXIMATE ELEVATION OF 746.5 FEET AMSL, AND THE STRATIGRAPHY DEPICTED FOR THE INTERVAL 746.5 TO 738 FEET AMSL IS TAKEN FROM MW-9B (PROJECTED ONTO THE SECTION).

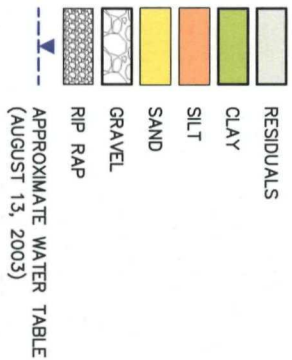
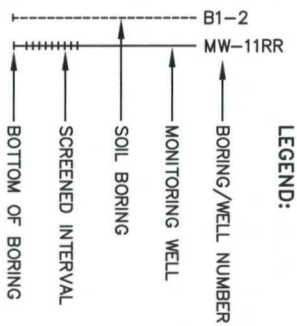
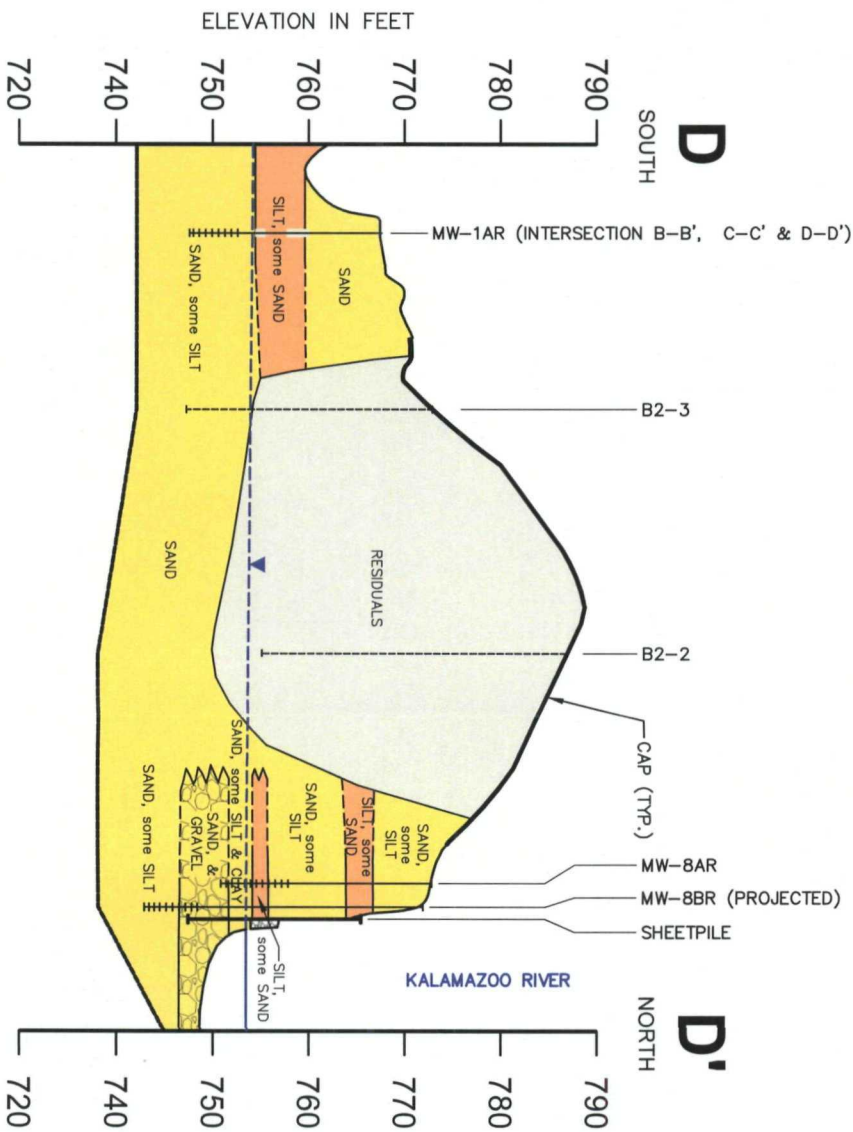
8. STRATIGRAPHY FROM MW-13AR IS DEPICTED ON THE SECTION TO AN APPROXIMATE ELEVATION OF 751 FEET AMSL, AND THE STRATIGRAPHY DEPICTED FOR THE INTERVAL 751 TO 735 FEET AMSL IS TAKEN FROM MW-13B (PROJECTED ONTO THE SECTION).

9. DEPTH OF RESIDUALS IN MW-1AR AND MW-13B WERE APPROXIMATED BASED ON MONITORING WELL CONSTRUCTION LOGS.

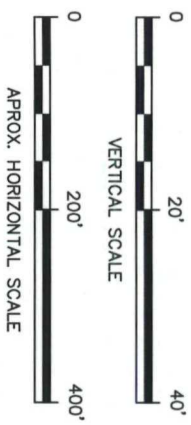


ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
FINAL REPORT FOR COMPLETION OF CONSTRUCTION
KING HIGHWAY LANDFILL OPERABLE UNIT

GEOLOGIC CROSS SECTION C-C'



- NOTES:
- SUBSURFACE CROSS SECTION TAKEN FROM "TECHNICAL MEMORANDUM 6 - KING HIGHWAY LANDFILL OPERABLE UNIT", (BLASLAND, BOUCK & LEE, INC., 3/94).
 - TOPOGRAPHIC MAPPING FOR SUBSURFACE CROSS SECTIONS PRODUCED USING PHOTOGRAMMETRIC METHODS BY LOCKWOOD, INC. FROM AERIAL PHOTOGRAPHY FLOWN 4/91.
 - SURFACE CONTOUR ELEVATIONS SHOWN ARE BASED ON A FIELD SURVEY BY ATWELL-HICKS, INC. ON 9/27/00.
 - SURFACE WATER ELEVATION IS APPROXIMATE.
 - SHEETPILE PROJECTED ONTO SECTION.
 - WELL/BORING LOCATIONS SURVEYED BY WADE-TRIM, INC.
 - STRATIGRAPHY FROM MW-8AR IS DEPICTED ON THE SECTION TO AN APPROXIMATE ELEVATION OF 751 FEET AMSL, AND THE STRATIGRAPHY DEPICTED FOR THE INTERVAL 751 TO 743 FEET AMSL IS TAKEN FROM MW-8BR (PROJECTED ONTO THE SECTION).
 - DEPTH OF RESIDUALS IN MW-1AR WAS APPROXIMATED BASED ON MONITORING WELL CONSTRUCTION LOG.



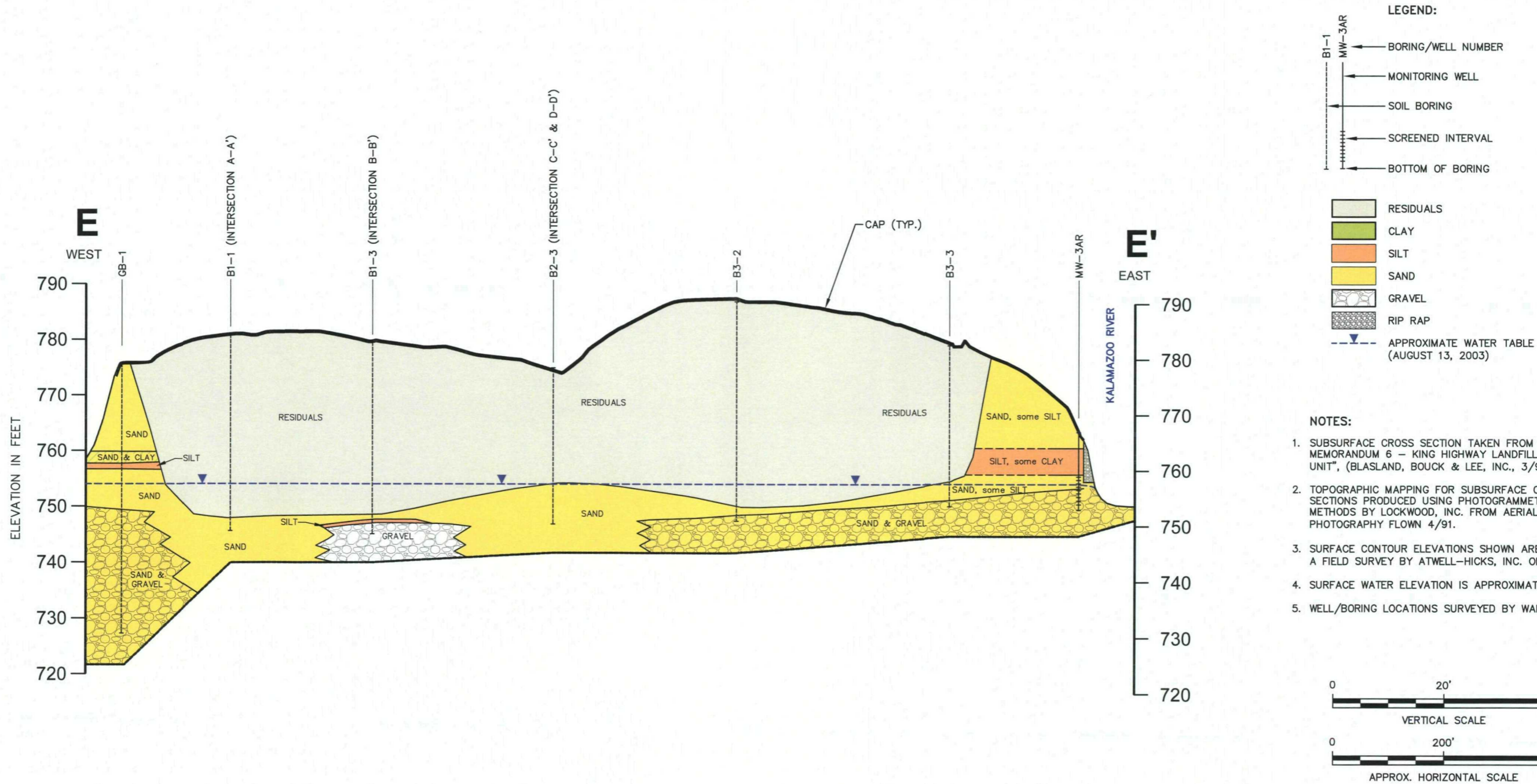
ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
FINAL REPORT FOR COMPLETION OF CONSTRUCTION
KING HIGHWAY LANDFILL OPERABLE UNIT

GEOLOGIC CROSS SECTION D-D'

FINAL



CITY: SYRACUSE DIV/GROUP: ENV/CAD DB: R. ALLEN L. POSENAUER L. FORAKER LD: PIC: D. COWIN PM: D. PENNIMAN TM: D. PENNIMAN LYN: ON: OFF: REF: G:\ENV\CAD\SYRACUSE\ACT\B006483\0004\00907\DWG\COMPLETION\B006483\05.DWG LAYOUT: 22. SAVED: 4/17/2013 11:28 AM ACADVER: 18.1S (LMS TECH) PAGES: 18 PLOT: 4/17/2013 11:28 AM BY: FORAKER, LYDIA



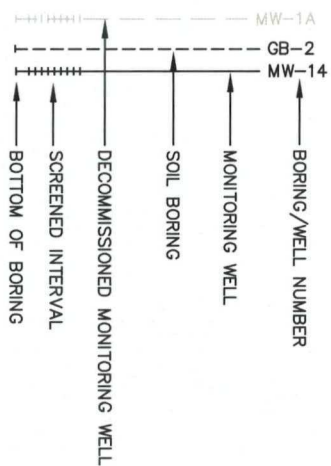
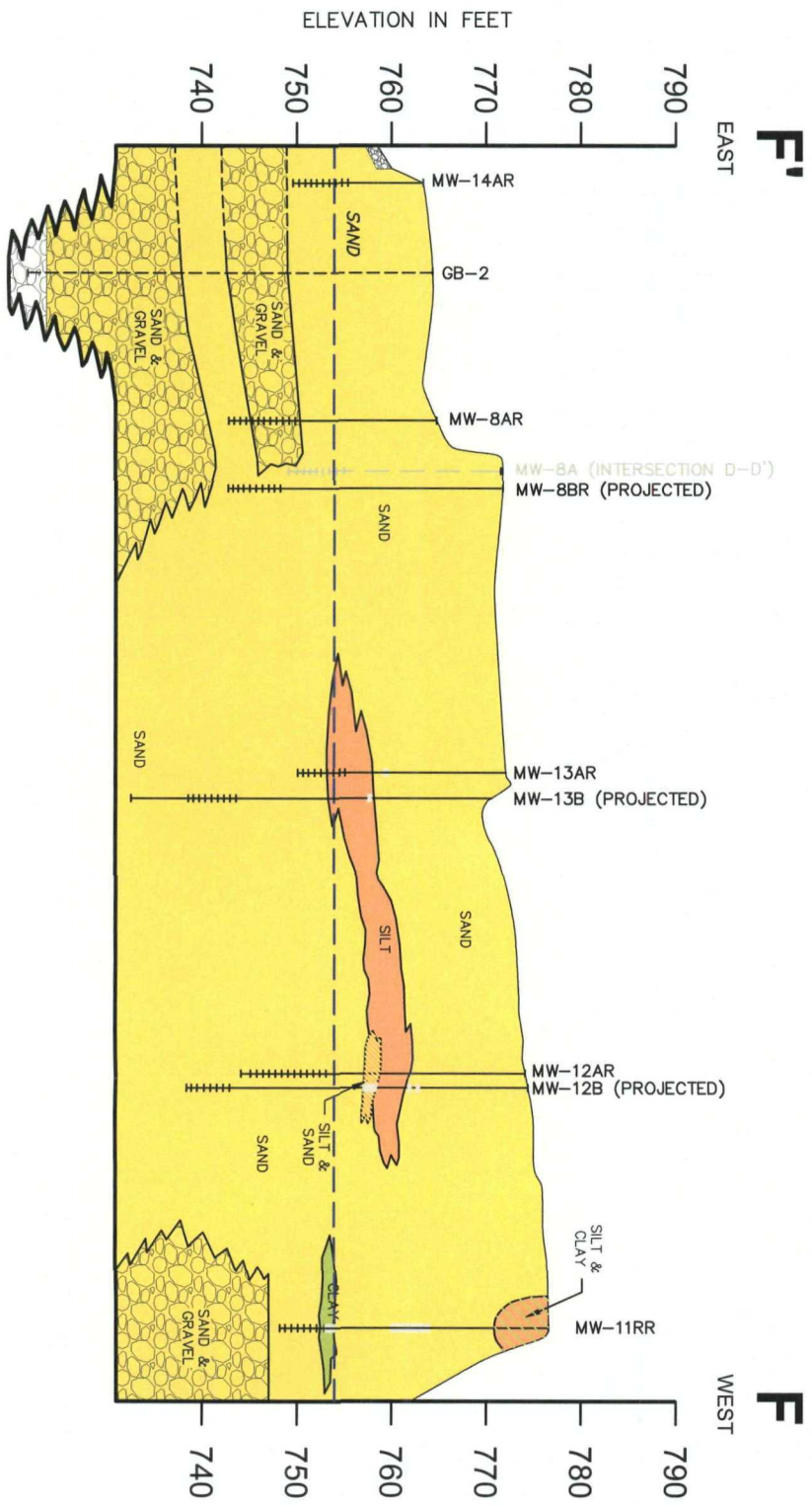
FINAL

ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
**FINAL REPORT FOR COMPLETION OF CONSTRUCTION
KING HIGHWAY LANDFILL OPERABLE UNIT**

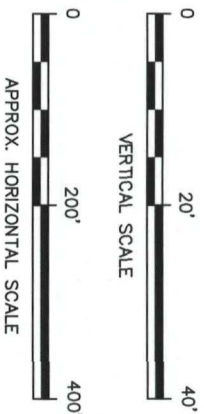
GEOLOGIC CROSS SECTION E-E'

ARCADIS

FIGURE
22



- NOTES:**
- SUBSURFACE CROSS SECTION TAKEN FROM "TECHNICAL MEMORANDUM 6 - KING HIGHWAY LANDFILL OPERABLE UNIT", (BLASLAND, BOUCK & LEE, INC., 3/94).
 - TOPOGRAPHIC MAPPING FOR SUBSURFACE CROSS SECTIONS PRODUCED USING PHOTOGRAMMETRIC METHODS BY LOCKWOOD, INC. FROM AERIAL PHOTOGRAPHY FLOWN 4/91.
 - SURFACE CONTOUR ELEVATIONS SHOWN ARE BASED ON A FIELD SURVEY BY ATWELL-HICKS, INC. ON 9/27/00.
 - WELL/BORING LOCATIONS SURVEYED BY WADE-TRIM, INC.
 - SHEETPILE PROJECTED ONTO SECTION.
 - SILT AND CLAY UNIT AT MW-11RR IS BACKFILL USED FOR ACCESS TO DRILLING LOCATION.
 - DEPTH OF RESIDUALS IN MW-1AR WAS APPROXIMATED BASED ON MONITORING WELL CONSTRUCTION LOG.
- Legend symbols include: RESIDUALS, CLAY, SILT, SAND, GRAVEL, RIP RAP, and APPROXIMATE WATER TABLE (AUGUST 13, 2003).

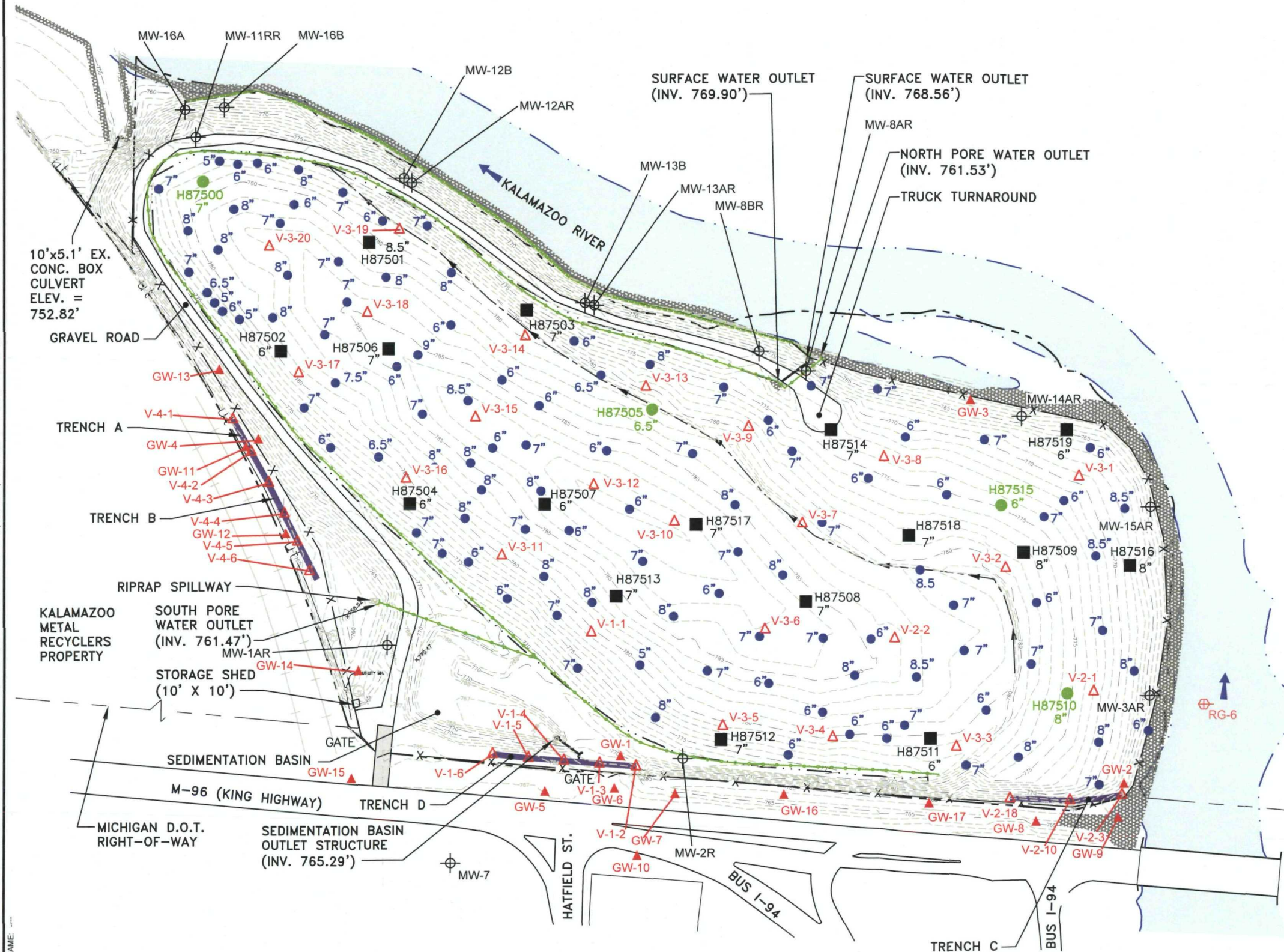


ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
**FINAL REPORT FOR COMPLETION OF CONSTRUCTION
KING HIGHWAY LANDFILL OPERABLE UNIT**

GEOLOGIC CROSS SECTION F-F'

FIGURE
24

CITY: SYRACUSE DIV/GRUP: ENVCAD DB: G. STOWELL L. POSENAUER L. FORAKER LD. PIC: D. COWIN P.M. D. PENNIMAN T.M. D. PENNIMAN LVR: ON= OFF= REF= G:\ENVCAD\STRACUSE\ACT\1806049300040000\DWG\COMPLETION\4583B17.DWG LAYOUT: 25 SAVED: 4/17/2013 11:31 AM ACADVER: 18 (LMS TECH) PAGES: 18 PLOT: 18 PLOT DATE: 4/17/2013 11:31 AM BY: FORAKER, LYDIA



LEGEND:

- APPROXIMATE OUTSIDE PARCEL BOUNDARY
- - - DITCH LINE
- - - ABANDONED RAILROAD
- SHEETPILE WALL
- ACCESS ROAD
- RIPRAP
- CULVERT PIPE
- FINAL AS-BUILT INDEX CONTOUR
- FINAL AS-BUILT INTERMEDIATE CONTOUR
- X- SECURITY FENCE
- PORE WATER COLLECTION PIPE
- PORE WATER DRAIN
- APPROXIMATE WATER EDGE
- V-1-2 GAS VENTS
- LANDFILL GAS CUTOFF TRENCH
- FLOW DIRECTION
- MW-14 MONITORING WELL
- RG-3 FORMER RIVER GAUGE STATION (NO LONGER IN USE)
- GW-2 LOCATION OF GAS MONITORING PROBES
- 7" APPROXIMATE LOCATION OF LAYER THICKNESS VERIFICATION LOCATION AND RESULT
- H87501 7" APPROXIMATE LOCATION OF PARTICLE SIZE LABORATORY SAMPLE AND THICKNESS VERIFICATION RESULT
- H87515 6" APPROXIMATE LOCATION OF PERMEABILITY AND PARTICLE SIZE LABORATORY SAMPLE AND THICKNESS VERIFICATION RESULT

NOTES:

1. BASE MAP INFORMATION OBTAINED FROM CADD DRAWING FILE DEVELOPED BY RMT, INC., ANN ARBOR, MICHIGAN (CADD FILE: L1630SU01.DWG AS-BUILT SURVEY; 8/21/00).
2. FINAL AS-BUILT CONTOUR ELEVATIONS ARE SHOWN AND ARE BASED ON A FIELD SURVEY BY ATWELL-HICKS, INC., DATED 9/27/00 WITH REVISIONS DATED 10/23/00, 12/21/01, 12/10/02, AND 7/24/03.
3. ELEVATIONS ARE BASED ON NGVD OF 1929 (MSL).
4. PROPERTY SURVEY PERFORMED BY WILKINS & WHEATON ENGINEERING CO., INC., ON 7/1/96.
5. TOPOGRAPHIC CONTOUR INTERVAL IS 1 FOOT.
6. LOCATIONS OF GW-5, GW-6, GW-7, GW-8, GW-9, AND GW-10 ARE BASED ON A FIELD SURVEY BY TERRA CONTRACTING LLC, DATED 9/23/05.
7. LOCATION OF GW-11 IS BASED ON A FIELD SURVEY BY TERRA CONTRACTING LLC, DATED 1/11/06.
8. LOCATIONS OF RG-6, V-4-4, V-4-5, AND V-4-6 ARE BASED ON A FIELD SURVEY BY TERRA CONTRACTING LLC, DATED 6/7/06.
9. LOCATIONS OF V-1-2 THROUGH V-1-6, V-2-3, V-2-10, AND V-2-18 ARE BASED ON MULTIPLE FIELD SURVEYS CONDUCTED BY TERRA CONTRACTING, LLC. IN APRIL 2008. GAS VENTS V-2-4 THROUGH V-2-9, AND V-2-11 THROUGH V-2-17 ARE NOT SHOWN FOR CLARITY PURPOSES (THESE VENTS ARE LOCATED ALONG TRENCH C).
10. LOCATION OF GW-12 IS APPROXIMATE.
11. LOCATIONS OF GW-13 THROUGH GW-17 BASED ON FIELD SURVEY CONDUCTED BY PREIN & NEWHOF ON 11/1/11.

- 10'x5.1' EX. CONC. BOX CULVERT ELEV. = 752.82'
- GRAVEL ROAD
- TRENCH A
- TRENCH B
- RIPRAP SPILLWAY
- KALAMAZOO METAL RECYCLERS PROPERTY
- SOUTH PORE WATER OUTLET (INV. 761.47')
- STORAGE SHED (10' X 10')
- SEDIMENTATION BASIN
- GATE
- M-96 (KING HIGHWAY)
- MICHIGAN D.O.T. RIGHT-OF-WAY
- SEDIMENTATION BASIN OUTLET STRUCTURE (INV. 765.29')
- HATFIELD ST.
- BUS I-94
- TRENCH C
- TRENCH D
- GW-15
- GW-5
- GW-10
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- GW-999
- GW-1000

GRAPHIC SCALE

0 160' 320'

FINAL

LEGEND:

- APPROXIMATE OUTSIDE PARCEL BOUNDARY
- - - DITCH LINE
- - - ABANDONED RAILROAD
- SHEETPILE WALL
- ACCESS ROAD
- RIPRAP
- CULVERT PIPE
- FINAL AS-BUILT INDEX CONTOUR
- FINAL AS-BUILT INTERMEDIATE CONTOUR
- X- SECURITY FENCE
- PORE WATER COLLECTION PIPE
- PORE WATER DRAIN
- APPROXIMATE WATER EDGE
- V-1-2 GAS VENTS
- LANDFILL GAS CUTOFF TRENCH
- FLOW DIRECTION
- MW-14 MONITORING WELL
- RG-3 FORMER RIVER GAUGE STATION (NO LONGER IN USE)
- GW-2 LOCATION OF GAS MONITORING PROBES
- 7" APPROXIMATE LOCATION OF LAYER THICKNESS VERIFICATION LOCATION AND RESULT
- H87501 7" APPROXIMATE LOCATION OF PARTICLE SIZE LABORATORY SAMPLE AND THICKNESS VERIFICATION RESULT
- H87515 6" APPROXIMATE LOCATION OF PERMEABILITY AND PARTICLE SIZE LABORATORY SAMPLE AND THICKNESS VERIFICATION RESULT

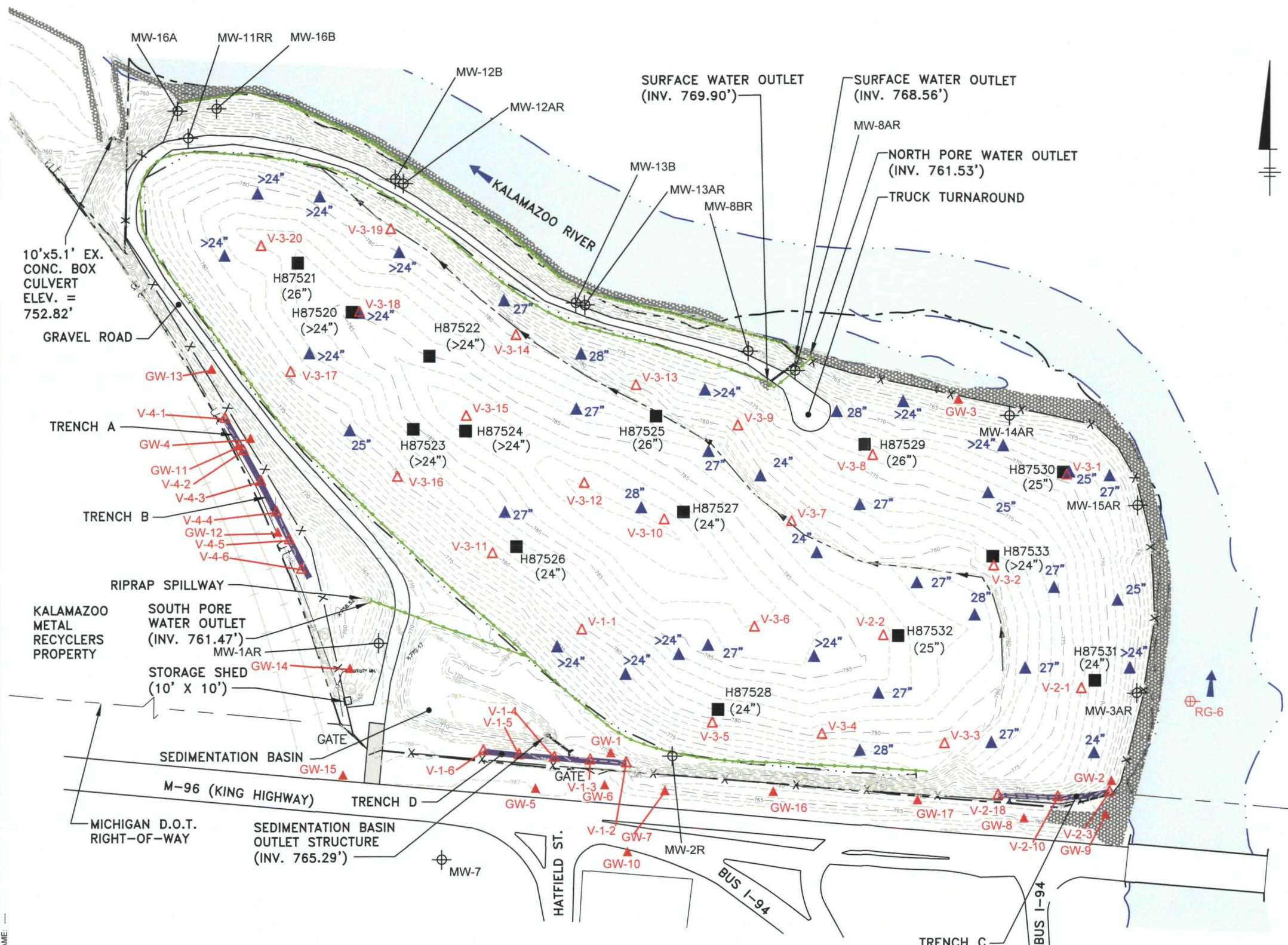
NOTES:

1. BASE MAP INFORMATION OBTAINED FROM CADD DRAWING FILE DEVELOPED BY RMT, INC., ANN ARBOR, MICHIGAN (CADD FILE: L1630SU01.DWG AS-BUILT SURVEY; 8/21/00).
2. FINAL AS-BUILT CONTOUR ELEVATIONS ARE SHOWN AND ARE BASED ON A FIELD SURVEY BY ATWELL-HICKS, INC., DATED 9/27/00 WITH REVISIONS DATED 10/23

CITY: SYRACUSE DIV/GROUP: ENV/CAD DB: G. STOWELL L. POSENAUER L. FORAKER LD. PIC: D. COWIN P.W. D. PENNIMAN TM: D. PENNIMAN LVR: ON= OFF= REF= G:\ENV\CAD\SYRACUSE\ACT\B0064583\000400907\DWG\COMPLETION\64583\B18.DWG LAYOUT: 26 SAVED: 4/17/2013 11:31 AM ACADVER: 18.1S (LMS TECH) PAGES: 18 PLOT: 4/17/2013 11:31 AM BY: FORAKER, LYDIA

PROJECTNAME: ...

IMAGES: 64583X01 64583X00



LEGEND:

- APPROXIMATE OUTSIDE PARCEL BOUNDARY
- . - . DITCH LINE
- - - ABANDONED RAILROAD
- ~ ~ ~ SHEETPILE WALL
- ACCESS ROAD
- RIPRAP
- CULVERT PIPE
- FINAL AS-BUILT INDEX CONTOUR
- FINAL AS-BUILT INTERMEDIATE CONTOUR
- X SECURITY FENCE
- PORE WATER COLLECTION PIPE
- PORE WATER DRAIN
- APPROXIMATE WATER EDGE
- V-1-2 GAS VENTS
- LANDFILL GAS CUTOFF TRENCH
- FLOW DIRECTION
- MW-14 MONITORING WELL
- RG-3 FORMER RIVER GAUGE STATION (NO LONGER IN USE)
- GW-2 LOCATION OF GAS MONITORING PROBES
- 28" APPROXIMATE LOCATION OF LAYER THICKNESS VERIFICATION LOCATION AND RESULT
- H87533 (>24") APPROXIMATE LOCATION OF PARTICLE SIZE LABORATORY SAMPLE AND THICKNESS VERIFICATION RESULT

NOTES:

1. BASE MAP INFORMATION OBTAINED FROM CADD DRAWING FILE DEVELOPED BY RMT, INC., ANN ARBOR, MICHIGAN (CADD FILE: L1630SU01.DWG AS-BUILT SURVEY; 8/21/00).
2. FINAL AS-BUILT CONTOUR ELEVATIONS ARE SHOWN AND ARE BASED ON A FIELD SURVEY BY ATWELL-HICKS, INC., DATED 9/27/00 WITH REVISIONS DATED 10/23/00, 12/21/01, 12/10/02, AND 7/24/03.
3. ELEVATIONS ARE BASED ON NGVD OF 1929 (MSL).
4. PROPERTY SURVEY PERFORMED BY WILKINS & WHEATON ENGINEERING CO., INC., ON 7/1/96.
5. TOPOGRAPHIC CONTOUR INTERVAL IS 1 FOOT.
6. LOCATIONS OF GW-5, GW-6, GW-7, GW-8, GW-9, AND GW-10 ARE BASED ON A FIELD SURVEY BY TERRA CONTRACTING LLC, DATED 9/23/05.
7. LOCATION OF GW-11 IS BASED ON A FIELD SURVEY BY TERRA CONTRACTING LLC, DATED 1/11/06.
8. LOCATIONS OF RG-6, V-4-4, V-4-5, AND V-4-6 ARE BASED ON A FIELD SURVEY BY TERRA CONTRACTING LLC, DATED 6/7/06.
9. LOCATIONS OF V-1-2 THROUGH V-1-6, V-2-3, V-2-10, AND V-2-18 ARE BASED ON MULTIPLE FIELD SURVEYS CONDUCTED BY TERRA CONTRACTING, LLC. IN APRIL 2008. GAS VENTS V-2-4 THROUGH V-2-9, AND V-2-11 THROUGH V-2-17 ARE NOT SHOWN FOR CLARITY PURPOSES (THESE VENTS ARE LOCATED ALONG TRENCH C).
10. LOCATION OF GW-12 IS APPROXIMATE.
11. LOCATIONS OF GW-13 THROUGH GW-17 BASED ON FIELD SURVEY CONDUCTED BY PREIN & NEWHOF ON 11/1/11.

ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
**FINAL REPORT FOR COMPLETION OF CONSTRUCTION
KING HIGHWAY LANDFILL OPERABLE UNIT**

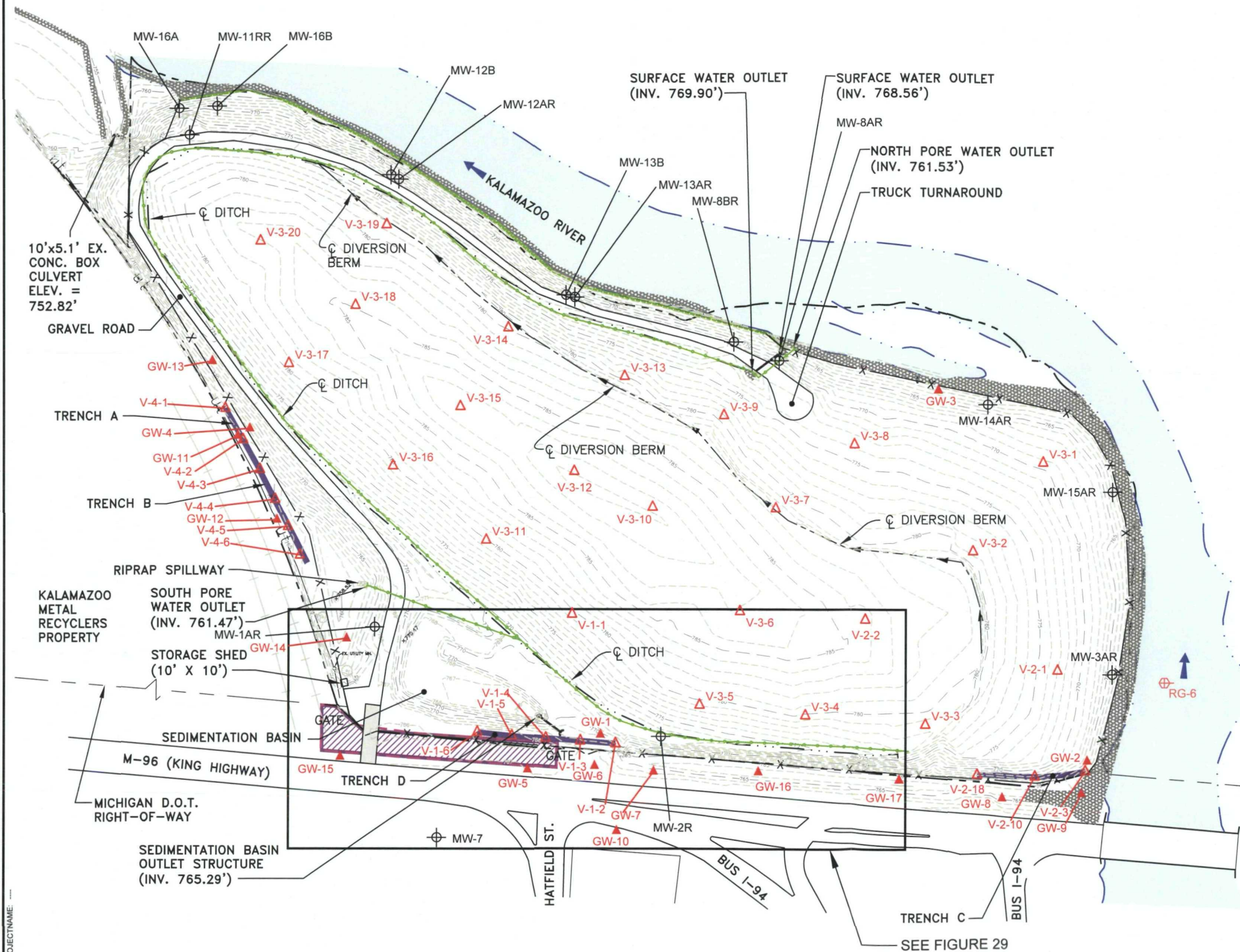
DRAINAGE/BARRIER PROTECTION LAYER SAMPLING LOCATIONS



FIGURE
26

FINAL

CITY: SYRACUSE DIV/GRUP ENV/CAD DB: G. STOWELL L. POSENAUER L. FORAKER LD: PIC: D. COWIN PM: D. PENNIMAN TM: D. PENNIMAN LTR: ON="OFF=REF" PLOTTED: 4/17/2013 11:33 AM BY: FORAKER, LYDIA
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PROJECTNAME: ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE



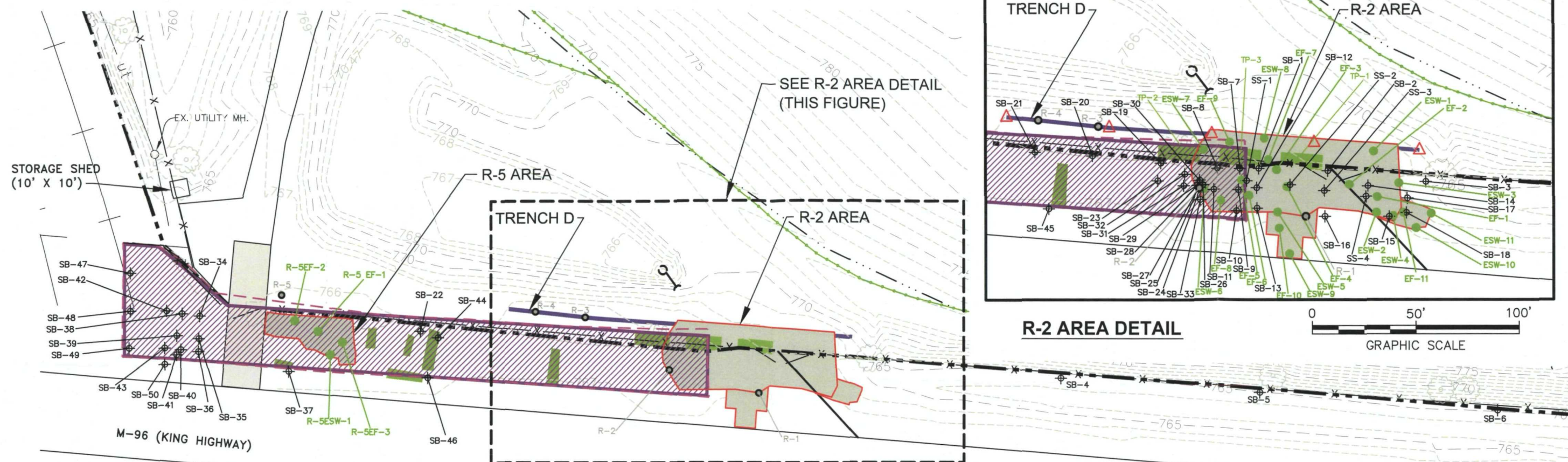
FINAL

ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
**FINAL REPORT FOR COMPLETION OF CONSTRUCTION
KING HIGHWAY LANDFILL OPERABLE UNIT**

AS-BUILT KHL SITE PLAN

ARCADIS

FIGURE
28



- SEE R-2 AREA DETAIL
(THIS FIGURE)

R-2 AREA DETAIL

GRAPHIC SCALE

0 60' 120'

GRAPHIC SCALE

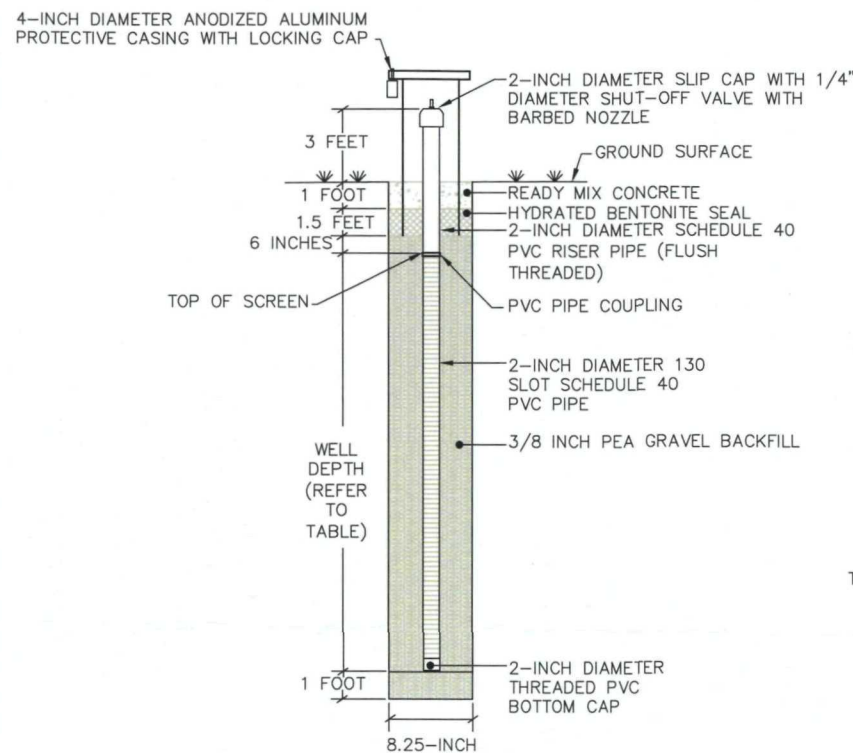
ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
**FINAL REPORT FOR COMPLETION OF CONSTRUCTION
KING HIGHWAY LANDFILL OPERABLE UNIT**

KHL R-O-W CONSTRUCTION WORK SITE PLAN

FINAL

FIGURE
29

CITY: SYRACUSE DIV: GROUP: ENV: CAD DB: S. KOWALCZYK L. POSEMAUER L. FORAKER LD: PIC: D. COWIN PM: D. PENNIMAN TM: D. PENNIMAN LYN: ON: OFF: REF: GLENCAD: STRAC: USE: ACT: 1806453000400807: DWG: COMPLETION: 6458322: DWG LAYOUT: 30 SAVED: 4/17/2013 11:34 AM ACADVER: 18 IS LMS TECH PAGESETUP: C4B-PDF PLOTSTYLETABLE: PLT: FULL CTB PLOTTED: 4/17/2013 11:34 AM BY: FORAKER, LYDIA XREFS: 64583X00 IMAGES: PROJECTNAME: ---



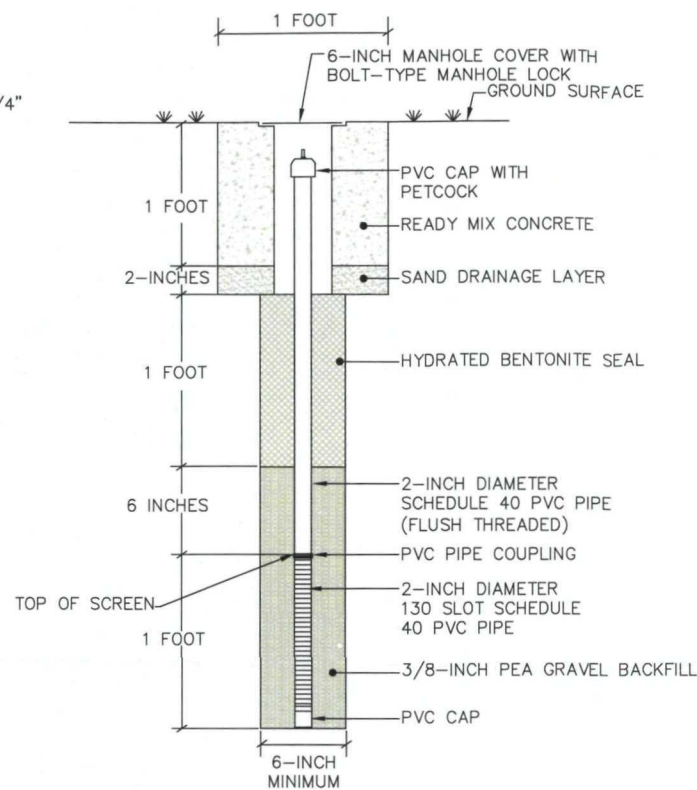
NOTE:

1. REFER TO TABLE FOR WELL DEPTHS.

PROBE NO.	WELL DEPTH (FEET)
GW-1	23
GW-2	14
GW-3	13
GW-4	33

GAS PROBES GW-1 THROUGH GW-4

NOT TO SCALE

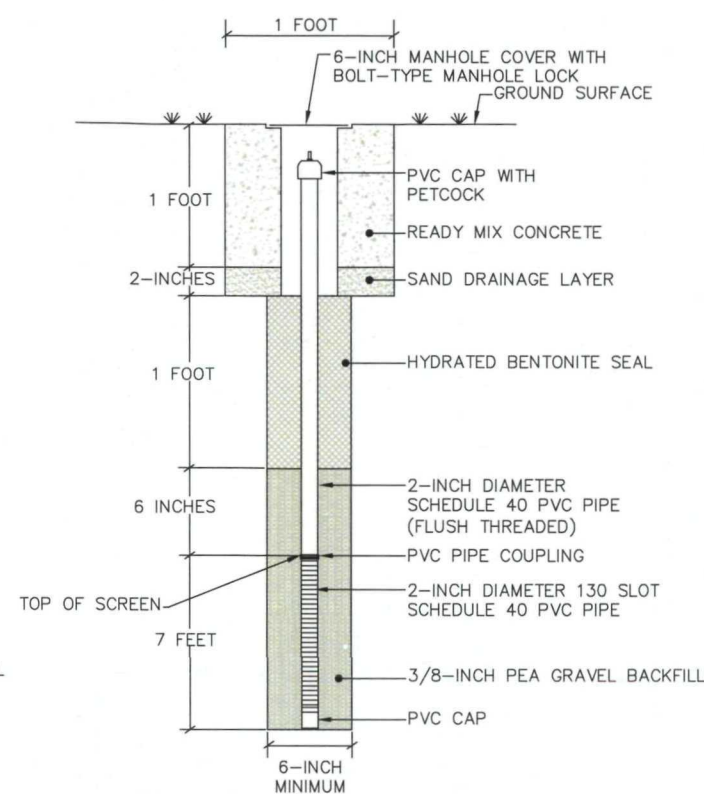


NOTE:

1. PROBES WERE INSTALLED USING HAND AUGER.

GAS PROBES GW-5 THROUGH GW-11

NOT TO SCALE

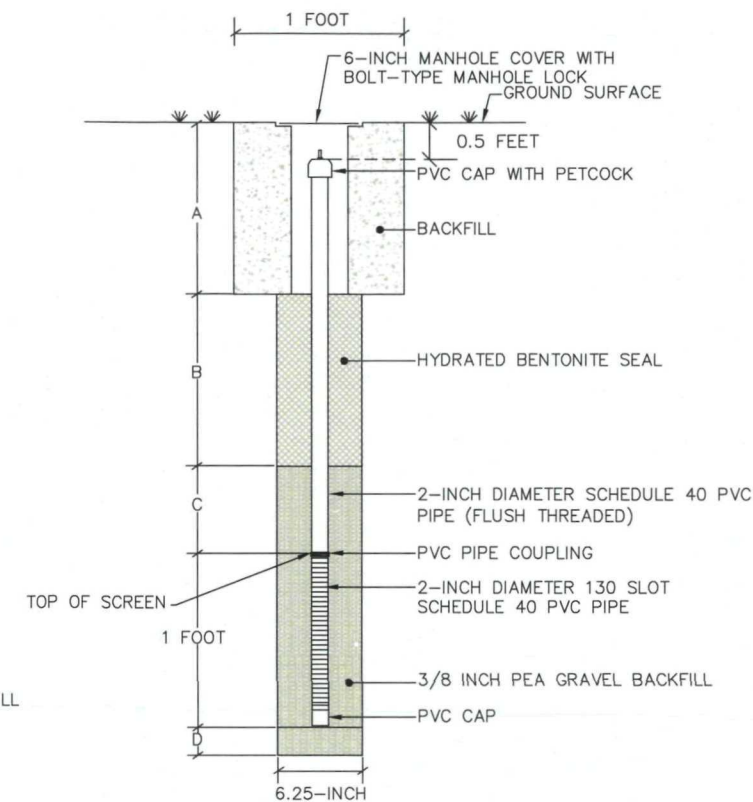


NOTE:

1. PROBES WERE INSTALLED USING HAND AUGER.

GAS PROBE GW-12

NOT TO SCALE



NOTE:

1. REFER TO TABLE FOR WELL DEPTHS.

PROBE NO.	WELL DEPTH (FEET)			
	A	B	C	D
GW-13	4.0	2.0	1.0	0.5
GW-14	3.0	2.5	0.5	0.5
GW-15	4.6	2.3	0.6	0.2
GW-16	4.0	2.0	1.0	0.2
GW-17	4.0	2.5	0.5	0.2

GAS PROBES GW-13 THROUGH GW-17

NOT TO SCALE

GENERAL NOTE:

1. GAS PROBES GW-5 THROUGH GW-17 DETAIL IS BASED ON TYPICAL GAS MONITORING PROBE DRAWING PROVIDED IN THE APRIL 25, 2005 LETTER TO MDOT.

FINAL

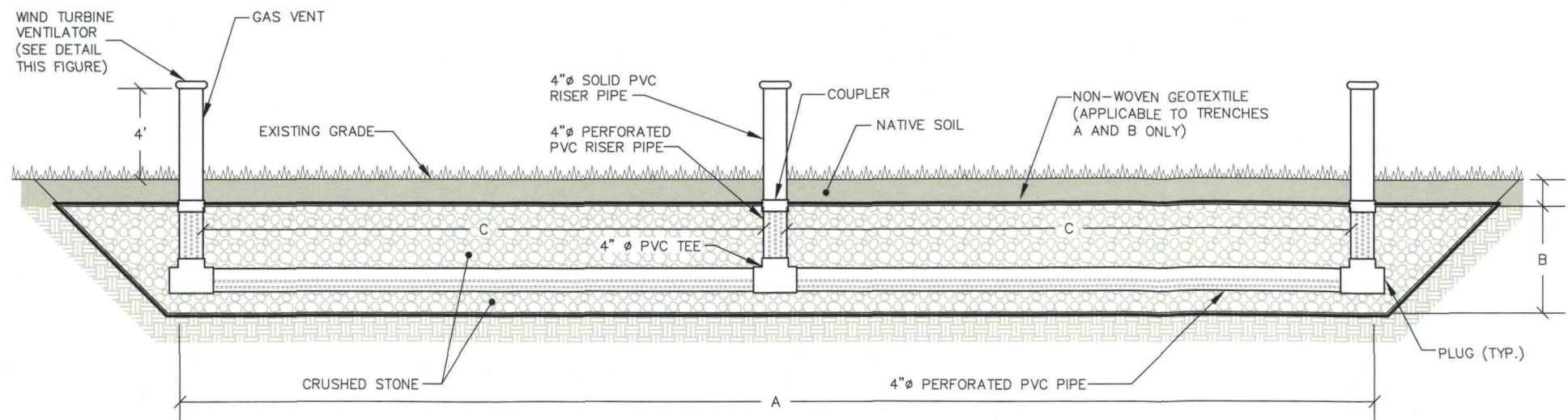
ARCADIS

FIGURE
30

ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
FINAL REPORT FOR COMPLETION OF CONSTRUCTION
KING HIGHWAY LANDFILL OPERABLE UNIT

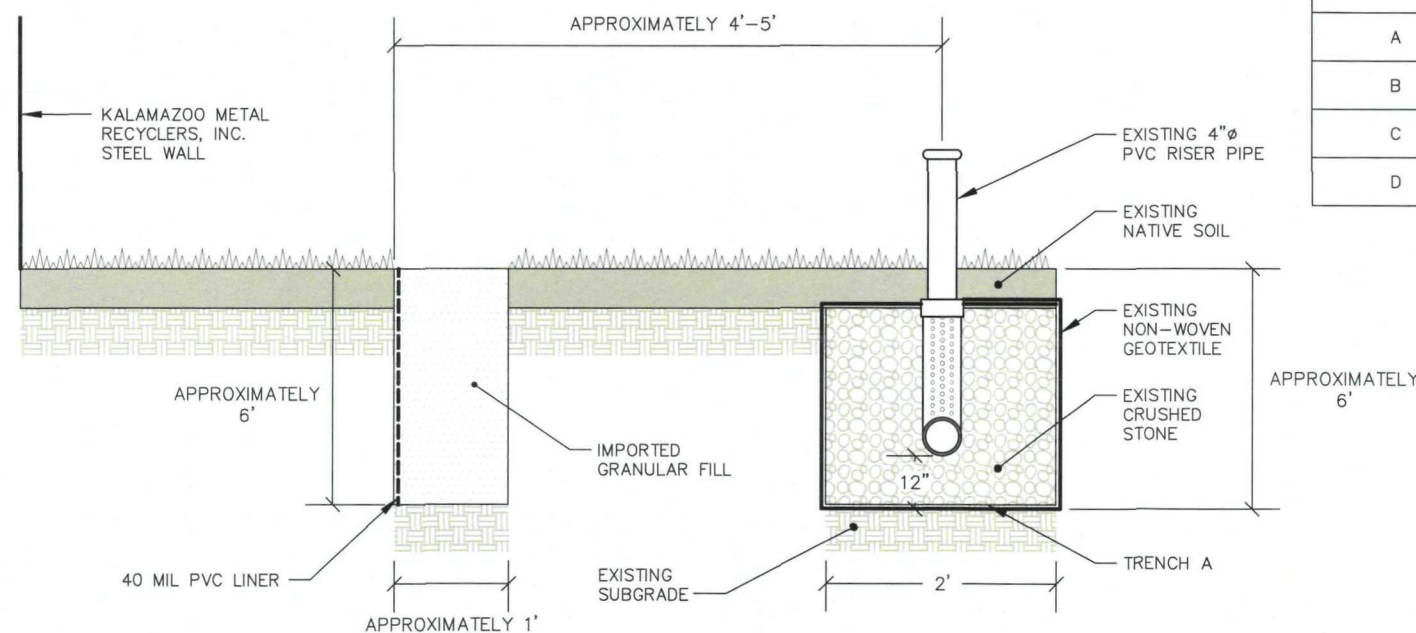
GAS PROBE
CONSTRUCTION DETAILS

CITY: SYRACUSE, NY DIV: GROUP 14/ENVCAD DB: L. POSENAUER L. FORAKER LD: PIC: D. COWIN PW: D. PENNIMAN TM: D. PENNIMAN LYN: ON=OFF=REF-
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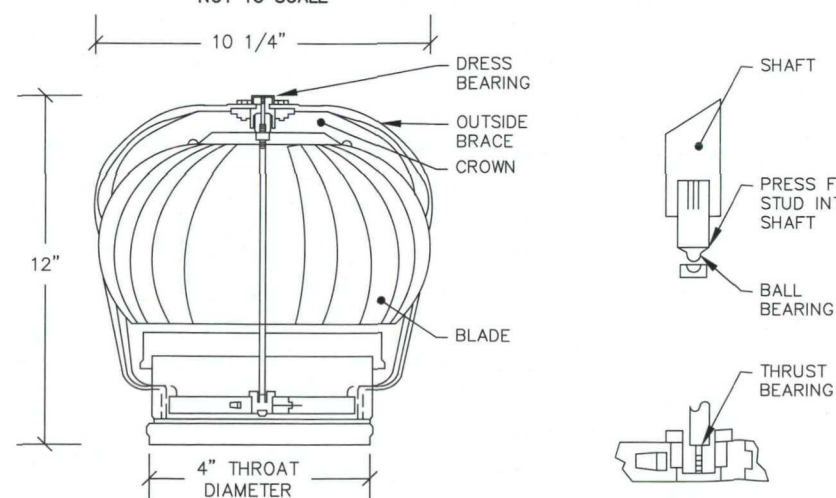
LANDFILL GAS CUTOFF TRENCH AND GAS VENT PROFILE

NOT TO SCALE



PVC LINER TRENCH SECTION

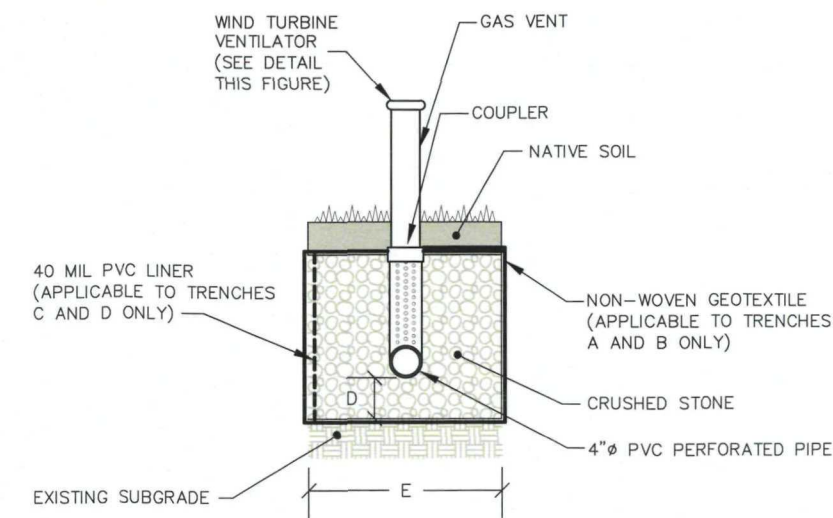
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WIND TURBINE VENTILATOR DETAIL

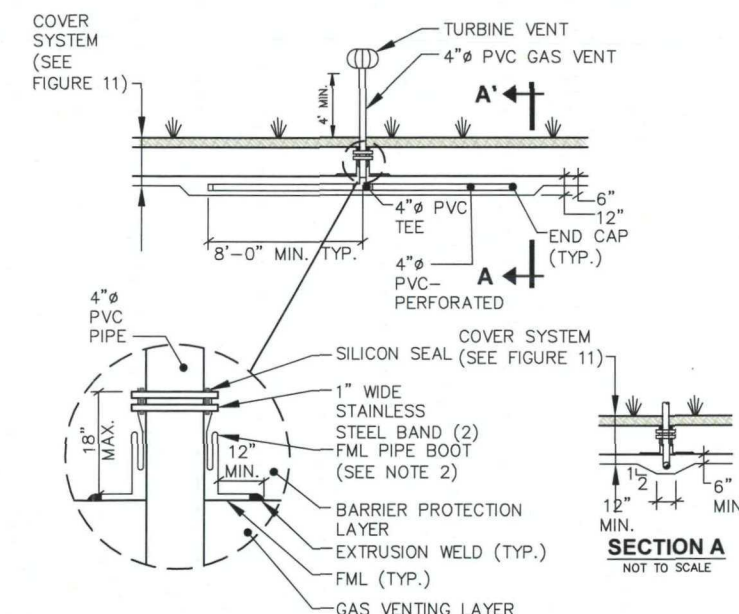
NOT TO SCALE

TRENCH ID	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)
A	100	5	50	1	2
B	150	9	50	5	2
C	150	5	10	0.5	1
D	200	9	50	5	2



LANDFILL GAS CUTOFF TRENCH AND GAS VENT SECTION

NOT TO SCALE



NOTES:

1. THIS DETAIL APPLIES TO THOSE GAS VENTS LOCATED WITHIN THE LIMITS OF THE LANDFILL. REFER TO FIGURES 5 THROUGH 9 FOR GAS VENTS WITHIN CUTOFF TRENCHES.
2. THE FML PROVIDES A MINIMUM 12" OF EXCESS FML.

GAS VENT DETAIL

NOT TO SCALE

ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
FINAL REPORT FOR COMPLETION OF CONSTRUCTION
KING HIGHWAY LANDFILL OPERABLE UNIT

LANDFILL GAS CUTOFF TRENCH, PVC LINER
TRENCH, GAS VENT, AND WIND TURBINE
VENTILATOR CONSTRUCTION DETAILS

FINAL

ARCADIS

FIGURE

31

Appendices (on Compact Disc)